



FIVE-YEAR REVIEW REPORT

Five-Year Review Report

for

Muskego Sanitary Landfill

City of Muskego

Waukesha County, Wisconsin

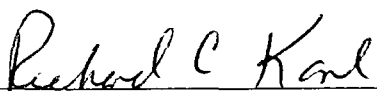
September 2004

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9-29-04

Five-Year Review Report

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List of Abbreviations and Acronyms

<u>NAME OR TERM</u>	<u>SHORTENED FORM</u>
Comprehensive Environmental Response, Compensation and Liability Act (Superfund)	CERCLA
Code of Federal Regulations	CFR
Enforcement Standard	ES
Institutional Controls	ICs
Maximum Contaminant Levels	MCLs
National Contingency Plan	NCP
Potentially Responsible Parties	PRPs
National Priorities List	NPL
Operation and Maintenance	O&M
Parts Per Billion	PPB
Preliminary Close-out Report	PCOR
Preventative Action Limit	PAL
Polychlorinated Biphenyls	PCBs
Record of Decision	ROD
Remedial Investigation/Feasibility Study	RI/FS
Remedial Design/Remedial Action	RD/RA
Unilateral Administrative Order	UAO
United States	U.S.
United States Environmental Protection Agency	U.S. EPA
Unlimited use and Unrestricted Exposure	UU/UE
Volatile Organic Compounds	VOCs
Wisconsin Department of Health and Family Service	WDHFS
Wisconsin Department of Natural Resources	WDNR

Executive Summary

This report documents the Second Five-Year Review for the Muskego Sanitary Landfill Site in Muskego, Wisconsin (the Site). The triggering action for this review is completion of the first Five-Year review on August 2, 1999. Therefore, the second Five-Year review was due by August 2, 2004. In June 2001, U.S. EPA issued the *Comprehensive Five-Year Review Guidance*. Hence, the second Five-Year review is more comprehensive than the first in compliance with the guidance.

This Five-Year Review utilizes the data submitted by the Potentially Responsible Parties (PRPs), Wisconsin Department of Natural Resources, Wisconsin Department of Health and Family Services, City of Muskego, community representatives and data developed by the U.S. EPA in order to provide an analysis of the protectiveness of the remedy implemented at the Site. At this point, U.S. EPA defers the determination of the short term protectiveness of the remedy at the Muskego Sanitary Landfill Site primarily due to the presence of off-Site contamination. Although portions of the final remedy have not yet been fully implemented, the sampling data presented generally indicates stable to declining groundwater contamination values on-Site; however, the selected remedial actions do not account for the inadequately characterized off-Site groundwater contamination which may affect or threaten to affect area residents or Municipal Well #7. Even though off-Site residences with evidence of contamination were hooked up to the municipal water, and it appears that there is no current exposure to any contaminants, the evidence does not currently exist to definitively make that statement due to the fact that off-site groundwater contamination discovered after initial remedy construction has not been fully characterized. Furthermore, although municipal water lines have been extended, it is not clear which residences have been provided municipal water, and not all the contaminated residential wells have been abandoned. In addition, the off-Site contamination has not been fully delineated. Therefore, further work is necessary to address these data gaps. The presence of contamination in the off-Site groundwater could affect the future protectiveness of the remedy if the plume were to expand to other private wells or Municipal Well #7. U.S. EPA has required that the PRPs address the data gaps through additional investigation. A Work Plan to address these requirements is under review by U.S. EPA and once approved and work is underway, U.S. EPA will provide necessary oversight of the work.

The remedy is not fully protective in the long term because the selected remedies in the Records of Decision for the Site do not address newly found contamination and further action must be taken to address it, and Institutional Controls could not be confirmed to be in place to protect the remedy and prevent exposure to contaminants on the land and in the groundwater. In order for the remedy to remain protective in the long term, engineering controls and ICs must be in place.

As identified in the first Five-Year Report, additional information is required for the remedy at the Site. The second Five-Year review confirms that those residences with known contamination have been supplied with alternative water; however, more information is needed and work is underway to fill data gaps. Once the investigation is completed by the PRPs with U.S. EPA oversight, U.S. EPA can determine whether further response activities are necessary.

Identified in the Issues Section below are general and specific recommendations based upon the Second Five-Year Review and which are required for operation and maintenance for overall protectiveness. The next Five-Year Review is due in September 2009.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Muskego Sanitary Landfill		
EPA ID (from WasteLAN): WID 000713180		
Region: 5	State: WI	City/County: Muskego/Waukesha
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify) _____		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs?* <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: PCOR 09/19/97	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Note: _____		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: Sheri L. Bianchin		
Author title: Remedial Project Manager	Author affiliation: U.S. EPA Region 5	
Review period: 1/2003 to 08/2004		
Date(s) of site inspection: 07/15/2004		
Type of review: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead </div> <div style="margin-left: 100px; margin-top: 5px;"><input type="checkbox"/> Regional Discretion</div>		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Actual RA Onsite Construction <input type="checkbox"/> Actual RA Start at OU# _____ </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report </div> <div style="margin-left: 100px; margin-top: 5px;"><input type="checkbox"/> Other (specify) _____</div>		
Triggering action date (from WasteLAN): 08/2/1999		
Due date (five years after triggering action date): 08/2/2004		

* ["OU" refers to operable unit.]

Issues:

There are current contamination issues related to the Site; however, plans are underway to address them as indicated below. U.S. EPA will continue to monitor the activities at the Site.

Assumptions made in the Groundwater Operable Unit (GWOU) Remedial Investigation/ Feasibility Study (RI/FS) and in the Record of Decision (ROD) selecting the GWOU appear to have been in error. The ROD assumed that the main aquifer, the sand and gravel unit, was used as a water supply downgradient of the Site for only two private residences (page 9). In addition, the sampling by the U.S. EPA in August 1991 showed no current impact of Volatile Organic Compounds (VOCs) at private wells downgradient of the Site (Page 7). Based upon review of more current information, it appears that there were actually a number of downgradient private wells in use at the time of the remedy selection. In addition, it appears that due to development in the area, new wells have been installed since the selection of the remedy. With the ability to set lower detection limits, and by expanding the well network, VOC contamination has recently been found in private wells in the vicinity of the landfill. This indicates that the monitoring network and characterization established by the ROD is inadequate and that further measures will be necessary to evaluate and, if necessary, address off-Site groundwater contamination. Although residences with known contamination have now been provided an alternative source of water, and some of the residences are part of the ongoing Site monitoring, the scope of this contamination has not been fully characterized and not all contaminated wells have been abandoned.

Recommendations and Follow-up Actions Based Upon the Second Five-Year Review:

The Following Recommendations and Follow-up actions are to be taken on the basis of the Five Year Review:

1. Potentially Responsible Parties (PRPs) are required to finalize Draft Responses to Comments for the draft Pilot Scale In-Situ Soil Vapor Extraction (ISVE) Test Report and submit them to the agencies. The agencies will decide whether to approve an upgrade to the landfill gas collection system in lieu of the ISVE installation system (specific requirement);
2. Continued operation, monitoring and adjusting of the landfill gas extraction system and reporting on operations in the progress reports (general requirement);
3. Continued operation, monitoring and adjustment of the leachate collection system and reporting on operations in the progress reports (general requirement);
4. Continued operation and maintenance of the groundwater extraction system, including the extraction wells and discharge piping network and reporting on operations in the progress reports (general requirement);
5. Continued routine environmental monitoring, as described in approved decision documents, and any additional environmental monitoring identified as part of the implementation of municipal water supply to residents or required by the U.S. EPA at the Site (general requirement);
6. Documentation of implementation of connection of municipal water supply by Respondents to

identified impacted residents in summer of 1999 (specific requirement which may affect short and long-term protectiveness);

7. Evaluation of effectiveness of extraction wells and system in place to ensure that the remedy is most efficient at containing contaminants on-Site and to prevent migration of contaminants off-Site. Also, to determine if expansion of the system is necessary to make progress towards cleanup standards (general requirement which may affect long-term protectiveness);

8. Data entry of past and present data into a database that can effectively model the groundwater and contaminant flow and Site situation, as approved by U.S. EPA (general requirement which may affect long-term protectiveness);

9. Ongoing evaluation, not just at five-year review (general requirement);

10. Conduct an institutional controls study and follow-up, as necessary. After the completion of an IC study, an IC implementation and monitoring plan will be developed to prevent exposure to existing contaminant levels. This plan will include contacting the state and local governments to assure new off-Site wells are carefully considered (specific requirement which may affect long-term protectiveness);

11. U.S. EPA will complete review of the Expanded Groundwater Monitoring Work Plan submitted earlier this year by the PRPs and will monitor its implementation, which is scheduled to begin in the fall of 2004. After approval of the work plan by the agencies, PRPs will conduct additional off-Site groundwater work including additional investigations in the area south and east of the Site to confirm groundwater flow direction in the area of the Site and to collect additional information on groundwater quality off-Site (specific requirement which may affect short and long-term protectiveness);

12. PRPs will upgrade groundwater monitoring systems to provide early warning of potential impact to downgradient residences and the municipal wells (specific requirement which may affect short and long-term protectiveness);

13. Sample off-Site wells including residential and county park wells (specific requirement which may affect short and long-term protectiveness);

14. Abandonment of contaminated residential wells (specific requirement which may affect short and long-term protectiveness);

15. Abandonment of deep (former manufacturing) on-Site wells (specific requirement which may affect short and long-term protectiveness);

16. Submission of quarterly and annual reports (general requirement);

17. Minor landfill cap repairs are necessary prior to the winter season (specific requirement which may affect long-term protectiveness);

18. Electronic data is to be submitted to U.S. EPA (general requirement);

19. Include the City of Muskego in the distribution of the quarterly progress reports (general requirement);
20. Prepare a more comprehensive database of private wells in order to assure that none are missed in this process (specific requirement which may affect short and long-term protectiveness);
21. Investigate whether flood protection for the cap is necessary; (specific requirement which may affect long-term protectiveness);
22. Investigate whether vapor intrusion is impacting residences (specific requirement which may affect long-term protectiveness); and.
23. Investigate whether landfill leachate flows moving laterally may have impacted the Fox River (specific requirement which may affect long-term protectiveness).

Protectiveness Statement(s):

U.S. EPA is deferring the short-term protectiveness determination at the Muskego Sanitary Landfill Site because more information is needed to make an accurate protectiveness determination. Although it appears that there is no current exposure to any contaminants, the evidence does not currently exist to definitively make that statement due to the fact that the off-Site groundwater contamination discovered after initial remedy construction has not been fully characterized. Although portions of the final remedy have not yet been fully implemented, the sampling data presented generally indicates stable to declining groundwater contamination values on-Site; however, the selected remedial actions do not account for the inadequately characterized off-Site groundwater contamination which may affect or threaten to affect area residents or Municipal Well #7. In the last 5 years, off-Site residences with evidence of vinyl chloride contamination were hooked up to the municipal water. This finding is based upon statements made by the PRPs; however, written documentation must still be provided to confirm these statements. There is no evidence that off-Site residents are presently exposed to off-Site groundwater contamination because the water mains have been extended to areas which were previously known to have contamination; however, numerous other private wells and Municipal Well #7 are all downgradient of the Site. Follow-up actions will be taken to address inadequate data. It is anticipated that the short-term protectiveness determination will be determined within 15 months after the additional information is collected and analyzed.

The remedy is not protective in the long-term because the selected remedial actions do not address the newly found contamination and must be amended to address it. Based on an initial review of available information, the Institutional Controls could not be confirmed to be in place. In order for the remedy to remain protective in the long term, engineering controls and ICs that restrict the use of Site property and groundwater and that prohibit drilling of groundwater wells must be in place to prevent exposure to contaminants.

Other Comments: Once the expanded groundwater monitoring work plan is approved, then work will get underway by the PRPs, with oversight by U.S. EPA, to address the existing data gaps so that U.S. EPA can make decisions whether further actions (documented by a ROD amendment or Explanation of Significant Differences (ESD)) are necessary.

**Muskego Sanitary Landfill
Muskego, WI
Second Five-Year Review Report**

I. Introduction

The Purpose of the Review

The purpose of Five-Year reviews is to determine whether the remedy at a site continues to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

Authority for Conducting the Five-Year Review

The U.S. EPA is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

U.S. EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for the unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

U.S. EPA Region 5, conducted this five-year review of the remedy implemented at the Muskego Landfill Site, in Muskego, Wisconsin. The review was conducted by the Remedial Project Manager (RPM) for the entire Site. This report documents the second Five-Year Review.

This is the second five-year review for the Muskego Sanitary Landfill Site. The triggering action for this review is completion of the first Five-Year review which was August 2, 1999. In June 2001, U.S. EPA issued the *Comprehensive Five-Year Review Guidance*. Hence, the second Five-Year review is more comprehensive than the first Five-Year review in conformance with the guidance.

Who Conducted the Five-Year Review

U.S. EPA conducted the five-year review analysis. U.S. EPA relied upon information provided by the PRPs through their contractor, Montgomery Watson, the Wisconsin Department of Natural Resources (WDNR), the Wisconsin Department of Health and Family Services (WDHFS), and the City of Muskego, as well as representatives from the community. An inspection of the Site was conducted on July 15, 2004 by the Remedial Project Manager for the U.S. EPA, along with representatives from the WDNR, and representatives from the PRP Group. During the Site inspection, the Site inspection team, monitored the integrity of the landfill cover systems, the wells and extraction systems and the fencing at the Site. U.S. EPA completed the review based on the information obtained during the Site inspection along with monitoring information and other information contained in the Site file and community interviews. Sampling data submitted during the ongoing Operations & Maintenance (O&M) process and historical data were also analyzed.

Other Review Characteristics

This review is being conducted 1) because the capping remedy at the Site allowed hazardous substances to be left on-Site above levels that allow for unlimited use and unrestricted exposure (UU/UE); 2) the groundwater contamination at the Site does not allow for UU/UE, and 3) newly identified contamination has been detected in groundwater off-Site and is under investigation. A ROD Amendment or ESD is anticipated in the future to address the issues identified with the off-Site groundwater contamination and to rectify several on-Site remedy changes.

II. Site Chronology

Exhibit 1 contains a Site Chronology.

III. Background

Physical Characteristics

The Site is a former landfill and dump site that operated from 1935 through 1975. The total volume of refuse in the landfill is estimated to be approximately 4.4 million cubic feet. In addition to municipal waste, various industrial wastes were disposed of at the Site, including waste paints and coating materials, plating wastes, solvents, waste materials, inks, and drummed material including polychlorinated biphenyls (PCBs). The contaminants present at the Site posed risks to humans via contact with and ingestion of surface soils and potential consumption of groundwater

contaminated with vinyl chloride, among other things. The Site also posed risks to aquatic organisms via contact with contaminated sediments in the wetland areas on-Site. The Site is approximately 56 acres in size.

Land and Resource Use

The Site is located in Southeastern Wisconsin approximately 15 miles southwest of the City of Milwaukee. The Site is approximately three miles south of the center of the City of Muskego and one mile west of the Village of Big Bend. Exhibit 2 Depicts a Site Location Map. Exhibit 3 is a map depicting known waste disposal areas.

The landfill property is bounded on the south by Janesville Road (County Highway L) and on the west by Crowbar Road. The Muskego Sanitary Landfill is located in the western half of Section 18, Township 5 North, Range 20 East, approximately three miles southwest of the City of Muskego in Waukesha County, Wisconsin. The Site includes three areas known as the "Old Fill Area," the "Southeast Fill Area," and the "Non-contiguous Fill Area." The Site also includes wastewater ponds associated with a former rendering plant complex (the "Anamax" plant).

Directly north of the Site is the Stoneridge Landfill, a closed and covered solid waste landfill that is not part of the Superfund Site. Land use to the west of the Site is for sand and gravel excavation. To the south, east and north of the site, the land use is a combination of residential and agricultural. Residences are located both south and east of the Site which is considered downgradient. The area surrounding the Site is semi-rural, but is zoned to permit further development.

The population of the City of Muskego is approximately 22,000. Although there is significant open land, development in the area is noticeable surrounding the Site. This trend was confirmed with City of Muskego representatives. It was stated that the City is developing at a rate of approximately 250 residences per year. Some of the development is occurring south and east of the Site which is an area of concern.

In the late 1980's, the city water main was extended in the area and several homes and businesses were connected. At the time of the first operable unit ROD, it was reported that only two residences southeast of the Site were not connected to public water. Either this was erroneous information or a number of wells have been installed since that time, since several private wells now surround the Site.

The Site is located within the Fox River watershed, just south of a local surface divide. Although there are numerous wetlands in the area and groundwater has a tendency for artesian flow conditions which produces springs, there are no streams or wetlands within or adjacent to the Site. The Site is located within the 100-year floodplain.

As is explained more fully below, the flow of the groundwater at the Site follows two general directions. The groundwater flows from north to south under the eastern portion of the Old Fill

Areas. The groundwater generally flows to the southeast under the Southeast and Non-Contiguous Fill Areas. There are three principal sources of groundwater in Waukesha County. In order of depth below the land surface, there is sand and gravel within the glacial drift, Niagara dolomite, and an underlying sandstone.

Groundwater and Hydrogeology

Hydrogeology

A thick layer of glacial drift of varying composition underlies the area. The thickness of glacial deposits varies from nearly 300 feet at the Site to approximately 5 feet approximately 0.5 mile south of the Site.

Exhibit 4 depicts the Stratigraphic Units of Southeastern Wisconsin. The Site is located in an area of thick glacial drift overlying the Niagara dolomite bedrock. The Site is the vicinity of a deep bedrock valley that is part of the Troy Valley. The bedrock valley is filled with sand and gravel and is capped by glacial till. This drift filled valley tends to the east a relatively steep bedrock slope rising to the south.

At the northern portion of the Site, the Upper New Berlin Formation till deposit forms an east-west trending moraine. In the northern portion of the Site, there is a portion of the lower sand unit that overlays the New Berlin Formation. Overall, the sand and gravel deposits of the lower sand unit are contiguous. In general, the surface of the gray till rises to the north, so the saturated thickness of the sand and gravel deposits decrease to the north. To the northwest and northeast, the gray till rises above the water table so, when present, the soil is not saturated. The thickness of the sand and gravel deposits decreases to the south and east where they are overlain by the Oak Creek till. The hydraulic conductivity of the Oak Creek till is generally very low, ranging from 1.5×10^{-6} cm/s to 5.1×10^{-9} cm/sec.

Groundwater

At the time of the RODs, groundwater was identified as the main pathway of concern for contaminant migration at the Site. This is still the case today.

Generally, the groundwater flow in the Site area varies in direction due to the complex geological features. The general groundwater flow for the region is from the north to the south. In the Muskego area, groundwater flow in the water table shallow aquifer is generally in an easterly to southeasterly direction. The regional water table map indicates that groundwater flow direction directly south of the Site is from the northwest to southeast and then changes to a more west to east direction, south of Janesville Road. (See Exhibit 5) Based upon information produced during the RI/FS, Appendix A, the potentiometric map shows groundwater flow to be consistent with what is documented on the regional water table map of Waukesha County produced by the Wisconsin Geological and Natural History Survey. Groundwater from the northern portion of the Site near the

old rendering plant lagoons is split by a low groundwater divide in the sand and gravel deposits. Therefore, in the central part of the Site, a low divide separates flow between a southeast component and a southern component. This divide is present in the vicinity of the northeast corner of the Old Fill Area of the landfill. There the groundwater at the Site takes on two predominant flow paths. One flow path moves generally along a Southeast route that is directed beneath the Non-Contiguous Fill Area and the Anamax Plant. The other is in a north to south direction under the eastern portion of the Old Fill Area where the basal clay unit separated the sand and gravel unit from the landfill. Hence, it is assumed that groundwater flow direction immediately east of the Site is from north to south, and takes on a more northwest to southeast component further to the east of Hillendale Drive. Groundwater flow on the north side of the Site occurs from north to south. Within unconsolidated areas located at the northern and western edges of the Site, the groundwater moves in a southerly direction. Additionally, conditions exist where leachate accumulates in areas above these flow paths in perched or elevated conditions.

Groundwater flow within the unconsolidated deposits in the vicinity of the Site primarily occurs in the lower sand unit (New Berlin Formation) and the upper sand seam (Oak Creek Formation). The upper sand seam appears to exist only in the southeast portion of the Site. However, the geology by the Southeast and Old Fill Areas consists of consolidated clay layers. Therefore, perched groundwater conditions exist in these areas. Groundwater has been reported to flow radially in all directions from these areas.

Similar to the groundwater flow, the water table in the Site areas also varies due to complex geological features. Since the Site is located at the end of two glacial advancements, the Berlin and Oak Creek formations, consolidated clay layers are intermixed with unconsolidated sand and gravel. The thickness of water table for the shallow unit varies, but in general is approximately 20 to 40 feet deep and produces yields as high as 2,000 gal /min. In areas where groundwater is perched or leachate is held within the basal layer, the water table is 20 to 30 feet deep.

Horizontal groundwater flow in the areas occurs in the sand and gravel deposits because of the low flow velocity within the Oak Creek Till. Artesian conditions have also been reported south of the Site. Although the sand and gravel operation west of the Site has a private well for sanitary purposes, they do not use a high capacity well for operations. Hence, it is not expected that the operations will alter regional groundwater flow.

The upper and lower sand and gravel unit in the vicinity of the Site appear to generally be the preferred aquifer for completion of water supply wells. A limited number of logs have been identified for the local residential wells. In general, it appears that the private wells east of the Site utilize the upper sand seam within the Oak Creek Till. Municipal water was expanded into parts of the area where formerly a majority of the residences had been served by private wells. From the record, it is not clear which residents were given the opportunity to connect to the municipal water, and if all the residences that were offered municipal water connected to the municipal water service and others were not given the opportunity. It is noted that the groundwater gradient north of the groundwater divide is steep and that velocities in this zone are relatively high due to the thin

saturated thickness of sand and gravel on top of the steeply sloping, low permeability gray till. South of this area the gradient flattens out due to the increased saturated thickness. The velocity in this confined sand and gravel is calculated to be 0.1 to 0.4 feet/day, which is reported as typical throughout the Site.

The depth of the upper glacial drift is about 300 feet thick, which corresponds to the aquifer thickness. The groundwater classification for this aquifer is Class II A (i.e., used for human consumption purposes and is not restricted.)

Even though public water was provided to the areas of Muskego downgradient of the Site in 1986 and again in 1999 (along Janesville Road to the South and Hillendale to the east), numerous private wells still exist. Presently, a majority of the private wells downgradient of the Site are finished in the thick sand and gravel deposits. The latest information available to U.S. EPA indicating the locations of the nearby private wells are shown in Exhibit 16.

The municipal well system is located a few miles east of the Site and is not near, nor is it affected by the Site. Hydraulic conductivity varies throughout the Site depending upon the soil type.

The closest municipal well is City Well # 7. City Well # 7 was installed in 1997 within the Muskego Country Park. This well was drilled to a depth of 263 feet below ground surface. This well has an open interval from 225-260 feet below ground surface and utilizes the lower sand unit.

History of Contamination

The Site is a closed municipal landfill/trash dump and an adjacent former animal rendering facility which covers approximately 60 acres. The landfill was originally a sand and gravel quarry that was converted by its owner into a public dump in 1954. In 1969, Acme Disposal, a subsidiary of Waste Management of Wisconsin, Inc. (WMWI), purchased the property. The last operator of the animal rendering plant was Anamax. In 1971, the dump was licensed as a sanitary landfill by the WDNR.

The Site is divided into three distinct parts: (1) the Old Fill Area, (2) the Southeast Fill Area, and (3) the Non-Contiguous Fill Area. (See Figure 1) .

Old Fill Area

The 38-acre Old Fill Area accepted material from the mid-1950s until 1977. An unknown amount of waste oils, paint products, and other wastes were deposited into the Old Fill Area during this time. The Old Fill Area includes the portion of the Site that was originally a sand and gravel quarry. Part of the Non-Contiguous Fill Area is located on the former Anamax Site.

Southeast Fill Area

The Southeast Fill Area, which covers about 16 acres, accepted only municipal wastes during its operation from 1977 to 1981.

Non-Contiguous Fill Area

The Non-Contiguous Fill Area includes a drum trench, north and south refuse trenches, and an L-shaped fill area. This Non-Contiguous Fill Area occupies approximately 4.2 acres northeast of the Old Fill Area. Based on information from workers employed during operation of the landfill, the L-shaped Fill Area contains waste similar to that in the Old Fill Area. During the Remedial Investigation (RI), a trench was discovered containing 989 55-gallon drums along with contaminated soil to the water table. The Site also includes wastewater ponds associated with the former Anamax facility.

Nature and extent of contamination as determined by the RIs

The RIs sampling of groundwater, soil, sediment and leachate was predominantly conducted at on-Site locations, with the exception of groundwater sampling which was also conducted in limited off-Site locations.

The Site groundwater investigation included analysis for Organics, Inorganics, Semi-volatile, Pesticides, target analyte list metals and cyanide, PCBs, and groundwater quality indicators. These results were evaluated with regard to existing State and Federal groundwater quality standards. The results are provided within the RI Report. Contaminants that exceeded 40 CFR part 141 Maximum Contaminant Levels (MCLs) include; thallium, cadmium, pentachlorophenol, vinyl chloride, 1,2-dichloroethane, trichloroethene, benzene, and 1,2-dichloropropane. Concentrations of contaminants varied significantly based on location within the Site. The Non-Contiguous Fill Area contained high concentrations of organics in several wells. Southeast of the facility vinyl chloride, a Class A carcinogen, was found at levels in exceedance of State and Federal drinking water standards. The results of the RI indicated that vinyl chloride was present in the groundwater at levels that exceed the MCL of 2 parts per billion established under the Safe Drinking Water Act.

A test pit excavated during the RI yielded an intact drum containing PCBs (approximately 14 percent), toluene (approximately 2 percent), iron, mercury, and various volatile and semi-volatile compounds. Contaminants were found to be present in soils, leachate, gas, and groundwater on Site. Sediment samples collected from the surrounding wetlands and runoff areas from the landfill contained the same constituents but at lower concentrations.

Following is a representative list of contaminants detected in groundwater, leachate, sediment and soil at or near the Site: benzene, ethylbenzene, toluene, xylene, chloroethane, 1-1-chloroethane, 1,2-dichloroethane, styrene, dichloropropane, trichloroethene, vinyl chloride, bis(2-ethylhex)phthalate, acetone, 2-Butanone, 2-Hexanone, tetrahydrofuran, 1,4-dichlorobenzene, 2-methylphenol, 4-methylphenol, pentachlorophenol, phenol, benzoic acid, mercury, butylbenzylphthalate, diethylphthalate, di-n-octylphthalate, PCBs, arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel and zinc.

The highest levels of contaminants on-site were detected within the Non-Contiguous

Fill Area.

During the RI, vinyl chloride was found southeast of the Site at Well P64 C at levels greater than the MCL. Also found there were 1,2 -dichloropropane, methylene chloride, arsenic, zinc, barium, zinc and manganese.

Risks were noted to be associated with movement of the contaminated groundwater in the sand and gravel aquifer to residential areas, exposure to landfill gas through methane migration in the soils or VOC migration in the air; direct exposure to contaminated soils or wastes if the barrier is not properly managed; and exposure to leachate. Without even completing a full baseline risk assessment, exceedances of the drinking water standards alone justified the interim action known as the source control operable unit.

Initial Response

In response to deteriorating water quality at on-Site groundwater monitoring wells, sampling of off-Site private water supply wells was conducted in 1982 and 1984 by the Site operator, WMWI, and WDNR. The results of these analyses indicated that several of the private wells may have been impacted by a source of contamination, which could have been the landfill and/or the Anamax wastewater lagoons. The results were based on elevated indicator parameters. The test for indicator parameters is a preliminary test completed to show signs of groundwater contamination. In 1982, during the Phase II Groundwater Investigation, a groundwater plume with a southern and eastern lobe was identified emanating from the Old Fill Area and the Wauer Rendering Plant wastewater lagoons. Specifically, PW4, PW5, and PW6 were identified as being affected by a groundwater plume, so bottled water was provided to those residences by WMWI. These wells were south and east of the Site.

In September 1983, a deep sandstone well (838 ft deep with 522 ft of casing) was installed and connections were then provided to residences formerly using PW4, PW5 and PW6 in 1982. These deeper wells were installed by WMWI as an alternative source of water. Some properties were also purchased by WMWI.

Landfill gas extraction systems were installed in the Old Fill Area and Southeast Fill Area. The gas extraction systems were implemented in April 1984. In 1983, leachate collection systems were retrofitted in the Southeast Fill Area, and the Old Fill Area. Both the gas extraction systems and the leachate collection systems are used to help control the releases from the landfill.

The Site was evaluated and ranked by the U.S. EPA and placed on the National Priorities List (NPL) on September 21, 1984.

Prior to initiating the formal RI/FS work, WMWI undertook various stabilization measures on Site. In 1985, a partial methane extraction system was installed by WMWI along the western portion of the Old Fill Area to alleviate methane gas migration that was noted at the Site where the extracted

gas is destroyed through flaring. Also in 1985, a contract was entered into between WMWI and the City of Muskego to extend city water service to some of the residents whose wells had been impacted. In 1986, the City of Muskego began supplying water to these residences from municipal wells.

Successful negotiations took place requiring the PRP Group to conduct the Remedial Investigation/Feasibility Study (RI/FS) under CERCLA. The Administrative Consent Order (AOC) was signed on August 14, 1987, and took effect on October 7, 1987.

The purpose of the RI was to identify sources of contamination and to characterize the contamination at the Site. The Final RI includes a Baseline Risk Assessment which was conducted to characterize the current and potential threat to public health and the environment at the Site.

To focus and expedite cleanup of the Site, the project was divided into two operable units, the Source Control Operable Unit (SCOU) and the Groundwater Operable Unit (GWOU) or Final Remedy.

These are described as follows:

--Interim Action Source Control OU (SCOU); this OU is used for control and remediation of the sources of contamination, including landfill waste, contaminated soils, leachate and landfill gas.
--Groundwater OU (GWOU)" This OU is for control and remediation of the contamination in the groundwater aquifers.

The RI/FS for the SCOU was concluded in 1992. The RI/FS for the GWOU was concluded in 1995.

In preparation of a portion of the Phase I Stoneridge Landfill area called Module III, which is due east of the Non-Contiguous Fill Area, buried drums were discovered in a pit. The drums and contaminated soils were excavated by Chemical Waste Management, Inc., under the supervision of WDNR, and transported to the Adams Center Landfill in Ft. Wayne, Indiana. Also, liquid wastes from the excavation and drums were transported to the SCA Incinerator in Chicago, Illinois. The contaminated soils were excavated until contaminant concentrations in subsequent soil samples were below action levels established by WDNR.

In addition, during the RI, a trench was discovered in a portion of the Non-Contiguous Fill Area that contained a large concentration of 55-gallon drums. The boundary of this drum trench area was further defined using a magnetometer metal detector. Through a Unilateral Administrative Order (UAO) issued on January 4, 1991, U.S. EPA ordered the PRPs to remove the drums and surrounding contaminated soils. WMWI proceeded to conduct this removal under U.S. EPA's supervision. Excavation of the drum trench began in April 1991 and was completed in May 1991. A total of 989 drums (55-gallon) were excavated along with approximately 2,500 cubic yards of surrounding contaminated soil. The drums contained liquids which were found to contain benzene,

toluene, chloroform, trichloroethene, ethyl benzene, methylene chloride, vinyl chloride, tetrachloroethene, 1,2-dichloroethane and 1,1-dichloroethene. The soils were excavated down to a depth of approximately 25 feet below the original surface elevation until groundwater was encountered.

The liquids from the excavated drums were separated, bulked, and disposed of through either a fuels blending program or incineration. The soils were disposed of in a hazardous waste cell unit at the Calumet Industrial Design Landfill (CID) in Calumet City, IL. Solids remaining in the drums were tested, bulked and accepted at a fuels blending facility in April 1992 for repackaging. The disposal procedures occurred from October 1991 through April 1992.

Findings of the RI

The Muskego Sanitary Landfill groundwater investigation included analysis for Organics, Inorganics, Pesticides, PCBs, and groundwater quality indicators. These results were evaluated with regard to existing State and Federal groundwater quality standards. The results are provided within the RI Reports.

Contaminants that were in exceedance of 40 CFR part 141 MCLs include thallium, cadmium, pentachlorophenol, vinyl chloride, 1,2-dichloroethane, trichloroethene, benzene, and 1,2-dichloropropane. Concentrations of contaminants varied significantly based on location within the Site. The Non-Contiguous Fill Area contained high concentrations of organics in several wells. Southeast of the facility Vinyl Chloride, a Class A carcinogen, was found at levels in exceedance of State and Federal drinking water standards. Site history and dumping practices within this area showed the Non-Contiguous Fill Area to be one of greatest concern, which resulted in the focused groundwater extraction and treatment system in this area.

The furthest VOC detection along the southeast flow path at the time of the RI was located in monitoring well P64C, located approximately 400 feet east of the southeast fill area. Recent samples east of this area (using low detection limit analysis) indicated the presence of vinyl chloride at several residential wells. Vinyl chloride was first detected in the Thiele well in 1997 and in the Pet supply well in 1999. Both of these wells are screened within the thin upper sand seam within the Oak Creek Till unit east of the Site.

Basis for Taking Action

The primary exposure pathway for humans identified during the RI/ FS for the SCOU was possible ingestion of or dermal contact with contaminated soils located at the Site. Unacceptable potential risks were also identified for possible ingestion of or dermal contact with contaminated groundwater at private residences downgradient of the Site.

IV. Remedial Actions

A. Remedial Objectives and Remedy Selection

Records of Decision

Two Records of Decision (RODs) for the Site have been issued. The initial ROD for the Site was dated June 12, 1992, was for the Source Control Operable Unit (SCOU). A Source Control Operable Unit Feasibility Study was completed in September 1991, which provided a detailed analysis of alternatives evaluated for the SCOU. The SCOU remedy proceeded as an interim remedial action even before the Baseline Risk Assessment and RI were completed. The SCOU focused on removing and containing remaining contaminants in on-Site soils to minimize the further spread of contamination. The remedy, as described in more detail below, included deed restrictions, fence extensions, cap installation, landfill leachate installation and upgrade, active landfill gas control and monitoring, in-situ soil vapor extraction, groundwater monitoring, and system operation and maintenance.

A second ROD for the Site, dated February 2, 1995. The ROD, presented the final portion of the remedy for the Site and was termed the Groundwater Operable Unit (GWOU). Together with the SCOU, the GWOU constitutes the Final Remedy for the Site. The FS for the GWOU was completed in March 1993. Site history and dumping practices within this area showed the Non-Contiguous Fill Area to be one of greatest concern which resulted in the focused groundwater extraction and treatment system in this area. The GWOU focused on cleaning up contaminated groundwater at the Site. The GWOU, as is described in more detail below, included groundwater monitoring, groundwater pumping tests, installation and operation of a groundwater extraction system in the vicinity of the Non-Contiguous Fill Area, disposal of treatment residuals, if any, at an approved facility, monitoring and evaluation of the groundwater extraction system, and expansion of the groundwater extraction system, if necessary. The GWOU ROD requires that ground water standards be met on-Site and off-Site.

Source Control Operable Unit

In June 1992, the Source Control Operable Unit (SCOU) ROD was issued for the Site. This action included the design and installation of a 2 foot clay cap over the waste areas, expanding the current leachate and gas extraction system over the entire Site, constructing an In-situ Soil Vapor Extraction (ISVE) system in the area of the drum removal and groundwater monitoring until the final remedy addressing groundwater was implemented.

The SCOU addresses protection of groundwater and exposure to soil contamination by reducing the risks posed by the Site through engineering and institutional controls. For the SCOU, no Site-specific cleanup numbers were established. A performance based standard was adopted. Specific cleanup numbers would be developed in the GWOU. The groundwater monitoring objectives of

the SCOU were as follows: Protect human health and the environment and provide an early warning for potential receptors. The SCOU also required that additional sampling be conducted to further characterize groundwater flow direction and quality in an effort to assure that human health and the environment are protected.

The ROD was signed for the Site on June 12, 1992, which required:

- Deed restrictions and Site controls that prevent access, excavation, and disturbance of the cap and installation of water supply wells;
- Fence extension to contain areas not enclosed by currently existing fences;
- Cap installation over the portions of the Site deemed necessary in the ROD according to Wisconsin Administrative Code NR 504 standards;
- Installation or upgrade of landfill leachate control systems at the Site;
- Active landfill gas control and monitoring for the Site;
- In-Situ (In place) Soil Vapor Extraction at portions of the Non-Contiguous Fill Area of the Site;
- Groundwater monitoring of selected existing monitoring and private wells to be determined during the remedial design; and
- Operation and Maintenance of all systems.

Groundwater Operable Unit

The Final Remedy for the Site, or the GWOU, is designed as a limited groundwater pump and treat system addressing contamination within the Non-Contiguous Fill area. This area was based on higher contaminant levels within the groundwater and a greater concentration of industrial disposal activities.

The Final Remedy addresses protection of groundwater and potential exposure to groundwater through engineering controls. The principal threats are direct exposure to contaminated groundwater through ingestion or inhalation at private wells. The ROD was signed on February 2, 1995 and the remedy is described as follows:

- Monitor groundwater throughout the Site;
- Conduct groundwater pumping test(s);
- Install and operate groundwater extraction in the vicinity of the Non-Contiguous Fill Area;
- Perform on-Site treatment and discharge of extracted groundwater from the Non-Contiguous Fill Area;
- Discharge treated water to an on-Site infiltration basin in accordance with state standards;
- Dispose of treatment residuals, if generated, to an approved disposal facility;
- Monitoring and evaluation of the effectiveness of the groundwater extraction system in achieving progress toward cleanup standards; and
- Expansion of the system if data on the performance of the system indicates that expansion is necessary to make progress toward cleanup standards.

B. Remedial Design/Remedial Action -Remedy Implementation

Source Control Operable Unit

On December 29, 1992, after negotiations failed, U.S. EPA issued a UAO to 46 responsible PRPs including WMWL. This UAO directed the PRPs to finance and conduct the remedy required by the SCOU ROD and additional work as U.S. EPA deemed necessary to comply with the ROD. Most of the remedial action work was completed in 1994.

The Remedial Design for this SCOU work was completed and approved in October 1993 and work began that same month. The entire project was completed by October 1994 with minor field modifications that included the removal of an underground storage tank and approximately 15 buried drums. Prior to the construction of the clay cap, several buildings from the Anamax Rendering facility were demolished, with the debris consolidated on-site. Full-time operation of the dual extraction wells for leachate and landfill gas began in November 1994. The ISVE design and construction has proceeded on a separate track.

Groundwater Operable Unit

In June 1995, another UAO was issued requiring the PRPs to finance and conduct the remedy as required by the GWOU ROD and additional work as U.S. EPA deemed necessary to comply with the ROD. Construction of a groundwater extraction system in the Non Contiguous Fill Area was completed in 1998, with operations and maintenance continuing.

A pilot study system was designed and installed as part of the Remedial Design in order to assist in developing well locations and pumping rates. This pilot study was conducted from August 20, 1996 through February 19, 1997. During this study, three extraction wells were installed as observation wells in order to evaluate the radius of influence and contaminant concentrations.

In May 1997, three additional soil borings were installed to supplement current data on the geologic formation southeast of the Non-Contiguous Fill Area. This information was used with the pump test data to determine optimal location of future extraction and/or observation wells. The pilot test showed sufficient capture with three wells, so that no additional pumping wells were necessary at that time, and it was anticipated that this system would achieve cleanup standards in a reasonable time frame. The system's effectiveness would be evaluated to determine if any modifications or if recommendations for further evaluation would be necessary.

No treatment system was put in place for the extracted groundwater because it was not deemed necessary during the pilot study since the discharged water was found to meet the municipal discharge limits. Therefore, extracted groundwater is presently discharged to the sanitary sewer. This information is documented in the March 1998 Final Remedial Action Implementation Report (RAIR) describing the installation of the remedy described in the GWOU Final (100%) RD,

comment letter. Review of the draft responses indicate that the comments have been successfully addressed. The conclusion reached in the ISVE Test Report is as follows: "The Draft ISVE Pilot Scale Test report concludes that an additional ISVE system would be redundant and unnecessary due to the relatively low contaminant level outside the trenches.It further states that it is more important to address the source of contaminants directly.Based upon this information, operation of the landfill gas collection system in the noncontiguous fill areas should be enhanced to include the collection of vapor contamination from these areas." U.S. EPA, in consultation with WDNR, will decide whether to approve an upgrade to the landfill gas collection system in lieu of the ISVE installation system. If acceptable, U.S. EPA may need to amend the ROD or document the change in an Explanation of Significant Differences.

2. Continued operation, monitoring and tuning of the landfill gas extraction system.

Followup steps taken: The PRPs have successfully followed through and fully complied with this recommendation. Evidence of the efforts are documented in the quarterly progress reports. This recommendation will be carried through to the next Five-Year review. In addition, U.S. EPA is considering requiring an upgrade to the landfill gas extraction system in accordance with the recommendation made in the ISVE Test Report.

3. Continued operation, monitoring and adjustment of the leachate collection system.

Followup steps taken: The PRPs have successfully followed through and fully complied with this recommendation. Evidence of the efforts are documented in the quarterly and annual progress reports. This recommendation will be carried through to the next Five-Year review.

4. Continued operation and maintenance of the groundwater extraction system, including the extraction wells and discharge piping network.

Followup steps taken: The PRPs have successfully followed through and fully complied with this recommendation. Evidence of the efforts are documented in the quarterly progress reports and the turn around documents. This recommendation will be carried through to the next Five-Year review.

5. Continued routine environmental monitoring, as described in approved decision documents, and any additional environmental monitoring identified as part of the implementation of municipal water supply to residents or required by the U.S. EPA, at the Site.

Followup steps taken: The PRPs have successfully followed through and have complied with this recommendation with the exception of City Well #7, which was recently added to the monitoring program by U.S. EPA. (See Exhibit 6) Evidence of the efforts are documented in the quarterly reports. The recommendation to continue monitoring will be carried through to the next Five-Year

review.

The PRPs have conducted quarterly groundwater monitoring in accordance with the approved groundwater monitoring plan. The approved groundwater monitoring program includes wells

Based upon concerns brought up by the City of Muskego and U.S. EPA's Drinking Water program, U.S. EPA modified the monitoring plan to include to City Well #7. The monitoring history for Well #7 is included as Exhibit 7. The last VOC sample in the PWS database was for March 2002. Sharon Shaver of the WDNR reported that vulnerability assessments are being completed for municipal community systems this year. Well #7 will be on a reduced monitoring schedule (i.e., its next compliance sample for VOCs will be in 2005); however the WDNR has not yet completed the Muskego Vulnerability Assessment yet. No waiver from VOC monitoring will be issued because of the well construction (unconsolidated material) and a use waiver won't be issued because of the proximity of the landfill and the contaminated private supply wells (Pet supply and Theile). The WDNR has received Muskego's completed forms for this compliance period's assessment.

6. Implementation of connection of municipal water supply by Respondents to identified impacted residents in summer of 1999.

Follow-up steps taken: The PRPs did connect many of the residences in the vicinity of the landfill to the municipal supply. A list of those residences has not yet been provided to U.S. EPA. Also, there are some residences south and east of this area which utilize a private water supply for potable purposes -and other purposes such as watering. Connection to the municipal water supply system should be evaluated for these homes.

7. Evaluation of effectiveness of extraction wells and system in place to ensure that the remedy is most efficient at containing contaminants on-Site and to prevent migration of contaminants off-Site. Also, to determine if expansion of the system is necessary to make progress towards cleanup standards.

Followup steps taken: U.S. EPA has required that the PRPs submit a work plan to conduct an evaluation of the extraction wells and system in place. Upon approval, a performance Evaluation Report will be submitted to U.S. EPA within 13 weeks. This recommendation will be carried through to the next Five-Year review.

VI. Five-Year Review Process

Administrative Components

The sampling activities, which are required pursuant to the Operation and Maintenance Plan for the Site and were performed routinely during the Five-Year review period, are detailed in the attached Monitoring Report.

During 2003, WDNR, the WDHFS, the City of Muskego, and the U.S. EPA Drinking Water program were notified of the Five-Year review. A notice was published in the local newspaper in early January 2004. The Muskego Five-Year review team was led by Sheri L. Bianchin, U.S. EPA RPM, and included members with expertise in hydrology, geology and chemistry.

The schedule was set in December 2003 to conduct the following tasks through July 2004

- Community Involvement
- Document Reviews
- Data Reviews
- Site inspections
- Local Interviews, and
- Five-year Review Report Development and Review

The schedule was extended through September 2004.

The completed Five-Year review report will be placed in the Site information repository, and notice of completion of the Five-Year review will be published in the local newspaper.

Community Involvement /Interviews

U.S. EPA published notice of the Five-Year review in the local newspaper in early January 2004. Public concerns regarding the Site were raised to U.S. EPA during the first Five-Year review due to identification of the presence of off-site groundwater contamination. Vinyl chloride, among other contaminants, has been detected in several downgradient private residential wells. U.S. EPA has met with citizens to discuss their concerns. Plans for follow-up actions have been made to address these concerns.

Specifically, for the Five-Year review, an interview was conducted with U.S. EPA's Drinking Water Program. Based upon an interview with Joseph Janczy, of U.S. EPA's drinking water program, concerns were raised about the public and private wells in the area. Vinyl chloride has been detected in residential wells located near the City of Muskego's well #7. Groundwater monitoring and work to characterize the extent of groundwater contamination continues to be necessary to protect public health.

U.S. EPA also conferred with Scott Kloskowski, public utilities superintendent; Sean McMullen, engineering/building inspection director for the City of Muskego; and their contractor Ted Powell of Ruekert Milke relative to their concerns for the Site. Their main interest/concern in relation to the Landfill is protecting Well #7 from potential contamination. They also wanted to get more frequent updates about the Site status. Well #7 is located just under one mile to the northeast of the landfill, and there is a possibility of an easterly groundwater flow direction from the landfill. Vinyl chloride has been detected in private wells east of the Site.

Although no interview was conducted with Henry Nehls-Lowe of the Department of Health and

Family Services, he has been involved in reviewing the work plans for additional groundwater investigation and has reported on various occasions that the concerns exist regarding municipal Well #7 and the off-Site residents.

An interview was conducted with the City of Muskego and its contractors. Their main concern was assuring that the City Well #7 does not become contaminated. They also reported that they would like to get more frequent Site updates.

Private Citizen Actions

Several of the citizens whose water supply has been affected have done independent environmental work, via contractors, -and have initiated a civil lawsuit for the contamination found.

The work undertaken by the private citizens is as follows:

- 1) Sampling of surface water;
- 2) Air sampling;
- 3) Vertical profiling of off-Site soils and groundwater at several locations off-Site which are downgradient of the landfill and upgradient of the private affected wells, and installation of two off-Site piezometers to be used for sampling of groundwater;
- 4) Sampling of off-Site piezometers and residential wells;

Based upon the results of this independent investigation, the citizens have reported that vinyl chloride was detected in surface water and groundwater which emanates from the landfill and have asserted that the plume of contamination in soil and groundwater needs to be defined in the area between the landfill and affected properties.

Their private lawsuit seeks damages for exposure to VOCs in the groundwater for these residences. The lawsuit also alleges that a number of residents downgradient of the Site have developed cancer and other adverse health effects linked to the exposures to contaminated groundwater.

Document and Data Review

This Five-Year Review also included a review of relevant documents, including O&M records, and monitoring data throughout the history of the Site. The list of documents and data reviewed in preparing for this Five-Year Review Report is listed in the attachment entitled "Bibliography." Applicable cleanup standards, as listed in the RODs, were reviewed. Actions taken at the NPL Site pursuant to AOC and UAOs have been conducted in accordance CERCLA, including the requirements of all identified applicable or relevant and appropriate requirements (ARARs) under state and federal law, and the NCP. A summary of the findings is presented below.

Site Inspection

On July 15, 2004, the U.S. EPA inspected the Site, along with representatives from the WDNR and the PRPs. The inspection involved observations of the integrity of the cap on the Site and the integrity of the monitoring wells. Present were: Larry Buechel, on behalf of the PRP Group; James Delwiche, Nancy Payne, Sharon Shaver and Roger Clark of the WDNR; and Sheri L. Bianchini of the U.S. Environmental Protection Agency. Documentation and photographs from the inspection are included in Exhibit 8.

During the Site visit, the above mentioned representatives drove and walked around the landfill and associated areas and inspected the surface of the landfill, the vegetative covering, the fence, monitoring wells, extraction wells, gas probes, drainage ditches and ponds. U.S. EPA determined that the wells and operating systems were well maintained and none were in need of repair. The integrity of the fence was good. U.S. EPA confirmed that the systems were fully operable and the remedy seemed to be performing effectively as reported in the O&M progress reports. Regarding the landfill cap, some small areas were noted where vegetation was less dense, but overall, there were no problems apparent from the observations made.

The Muskego Sanitary Landfill is routinely inspected in accordance with the Operation and Maintenance Plan for the Site. The results of this inspection are included in these Monitoring Reports. A list of contractors performing O&M is included in Exhibit 9.

Several other issues were discussed during the Site inspection.

As suggested during the Site visit, these deep wells former manufacturing wells need to be abandoned under Wis Adm Code Chapter NR 812. Because of the age, last possible use (>20 years), and location (LF and Rendering Plant), the PRPs will need to determine the well condition before abandonment (total well depth, any obstructions, casing pipe integrity, etc.). In addition, limited investigative work to determine well integrity and need for removal of pump oil or other contaminated media will be needed to determine and whether alternate well abandonment methods in accordance with NR 812 are needed to preclude cross-contamination of aquifers. In addition, it would be prudent to sample these wells prior to abandonment.

In addition, the integrity of the two wells in service at the county park and quality of water in those wells has been questioned. U.S. EPA believes that these wells should be sampled. Based upon the well construction reports for both wells, the following has been found: the picnic Area #3 well is 190 feet in total depth with 185 feet of casing and the Beach well is 189 feet with 182 feet of protective casing. Although the Beach House is on municipal water, the well serves the pond and picnic area # 2 (Southwest picnic area) at the park. The system is shut down seasonally from November to April. For the winter season the water lines are blown out with air to prevent freezing.

Operation and Maintenance

Due to the fact that wastes were left in place, via capping of the landfill, regular inspections to determine the integrity of the cap and groundwater and leachate monitoring must be conducted.

The Operation and Maintenance (O&M) for the Site consists of Site inspections to assess the integrity of the engineered systems and monitoring of the systems. These inspections have been and will continue to be an effective means to ensure the systems are operating effectively. For example, the cap is inspected periodically throughout the year. A formal inspection of the cap occurs each spring and fall. The area is generally mowed during those times.

A summary of the approved groundwater monitoring program is included as Exhibit 10. Groundwater data for the Muskego Sanitary Landfill is collected pursuant to the October 1997 Final Design Sampling and Analysis Plan as amended by U.S. EPA in October 2003.¹

The results from the periodic environmental monitoring required by the ongoing O&M activities on-Site are included in various reports, including the Quarterly and Semi-annual Progress Reports and the Quarterly Turnaround documents. The documents are submitted to the WDNR and U.S. EPA by the PRPs. (See Exhibit 11). These reports include information regarding the operating systems on Site including the gas, leachate and groundwater monitoring systems, and any other information regarding remedial activities.

The approved landfill gas and leachate monitoring programs for the Site are detailed in the Final Design Report (Rust E & I, September 1993). The systems are on-line, fully operational and generally continue to perform well.

Pursuant to the most recent quarterly progress report dated August 16, 2004, which is included as Exhibit 10, the operation of the groundwater extraction system continued and approximately 545,000 gallons, 901,000 gallons and 1,591,000 gallons were removed from extraction wells EW-1, EW-2 and EW-3R, respectively. Also, included was a Groundwater Extraction/Treatment System checklist. There have been no significant problems reported during O&M.

During the Five-Year review inspection, it was noted that a small portion the cap area was in need of minor repairs, and that a minor amount of erosion and settlement was apparent (see photographs in Exhibit 8). These areas were identified during normal O&M activities that occurred, but due to the amount of precipitation in the spring, the repairs would be difficult without possibly further

¹ In October 2003, U.S. EPA directed that the monitoring plan be modified to include Municipal Well #7 until the off-Site groundwater contamination is fully characterized. Although, Well #7 has yet to be included in the monitoring program, the City of Muskego has tested Wells #7 for VOCs on several occasions with no detects. Well #7 will be monitored by U.S. EPA and in the upcoming field investigation.

damaging the cap. As was pointed out by Mr. Buechel, WMWI, evidence of tire marks in one area indicated that the maintenance vehicle had difficulty navigating on the Site due to the extreme wetness. It was decided that it would be better to come back to make the repairs after the area had dried out. These areas will be repaired prior to the winter season. Also, since the cap has evidence of some erosion and the landfill is located in the 100-year flood plain, it would be prudent to investigate whether flood protection for the cap is necessary; this recommendation will be carried through to the recommendations section.

The GWOU requires that the PRPs submit quarterly progress reports. The SCOU requires that the PRPs submit semi-annual progress reports. These documents report on O&M for the Site's leachate and landfill gas management systems, the landfill cap and the groundwater extraction and monitoring systems, in accordance with the approved groundwater monitoring plans and quality assurance plans.

Specifically, the O&M progress reports include the following: whether any issues were detected, the total gallons of leachate removed from the extraction wells, inspection log of the groundwater extraction system and summary of any maintenance activities that were needed, dates that environmental monitoring was performed on-Site, analysis information for gas monitoring and leachate monitoring, discussion of analytical results submitted to the agencies, and any anticipated future activities. Examples of PRP submissions required pursuant to the Unilateral Administrative Orders for Implementing the GWOU and SCOU RODs are included as Exhibit 11.

Although the WDNR is providing the groundwater sampling data electronically, U.S. EPA has not been given the data electronically. It is recommended that U.S. EPA receive the information electronically as soon as possible. Further, U.S. EPA has requested electronic data from the PRPs in order to conduct the Five-Year Review (See Exhibit 12); however it was decided that U.S. EPA would first get electronic data from the WDNR. The PRPs would then fill in any missing information. U.S. EPA must also work with the PRPs regarding getting all future electronic data reports in a form that will be useable for the U.S. EPA.

Remedy Performance/ Areas of Noncompliance

Based upon the Construction Completion Report and the observations made during the Site inspection, U.S. EPA believes that the landfill cap and extraction system is fully adequate to protect against inhalation, ingestion and direct contact with the landfill materials, to prevent landfill materials from eroding and minimize migration off-Site, and to prevent significant amounts of water from infiltrating into the landfill.

As previously noted, off-Site groundwater contamination has been detected in downgradient areas and no other likely source of this contamination other than the Site has been identified. U.S. EPA believes that the on-Site remedy operations are functioning properly, but that previous operations may have left a residual area of contamination that was not detected until recently. Vinyl chloride is typically found as a breakdown product, so it is believed that as compounds from previous

operations are broken down, this vinyl chloride has come through the system. Further monitoring and investigation will offer more information on this matter and is included in the recommendations for this Five-Year review.

Site Monitoring Results are presented in various monitoring reports provided by the PRPs and discussed further below.

Data Review

Summary of Groundwater Information

Post-RI sampling of monitoring wells at the south side of the Site have indicated a generally stable to decreasing trend in VOC concentrations with time over the past several years. (Table E-1) VOCs were detected. Sampling associated with the RI indicated that the private wells south of Janesville Road (i.e., PW-2 and PW-8) had no detectable VOCs present using low level detection methods. Based upon samples collected during the RI, VOCs have been documented to exist within the lower sand and gravel unit under the Site (the upper sand seam was not thought to exist along most of the southern flow path.)

Results of VOC monitoring at private wells are presented in Exhibit 13 (Table 4). During the RI sampling, VOCs were detected along the south flow path at E 135 A and E 135 B locations approximately 800 feet south of the Old Fill Area. Table E, Ax E. In 2000, two monitoring wells were installed on the south side of Janesville Rd. on the property of the former Moose Lodge (PX Moose) and the Stagecoach Inn (PZ Stagecoach). These wells indicated VOCs were present in the groundwater in the lower sand unit. Post-RI sampling of monitoring wells at the east side of the Site have indicated a stable to decreasing trend in VOCs over time over the past several years, except for Well E 93 D.

Trend Analysis of Groundwater Data; Review of Groundwater Data

Based upon review of the Turnaround Documents and monitoring data from April 1999 to April, 2004 for the Muskego Sanitary Landfill, the following exceedences of NR 140 standards were noted for the following chemicals: arsenic, cadmium, copper, chloride, iron, fluoride, lead, manganese, mercury, selenium, sulfate, thallium, zinc, benzene, cis-1,2-dichloroethene, 1,2-dichloroethane, dichloromethane, 1,2-dichloropropane, trichloroethylene, tetrachlorethene, tetrahydrofuran, xylene, vinyl chloride, and chemical oxygen demand.

Iron, manganese, cadmium, arsenic and possibly lead may be occurring naturally at the Site; however this has never been confirmed.

Statistical Analysis of Groundwater Data

Based upon the electronic data harvested from the WDNR data base, U.S. EPA tasked its contractor

to conduct analysis of the data. The report provides detailed results of the analysis including graphs, tables and equations of all the statistical tests. The full unabridged report is approximately 860 pages and will be placed in the Site file for Muskego; the abridged version of the report is approximately 130 pages and is included as Exhibit 14 and is titled *Muskego Sanitary Landfill, Statistical Analysis Report; Sampling Period: February 1973 to October 2003*.

Three different statistical tests were run on the data using CAR Stat. These analyses were comparison to standard test, comparison to baseline test (Significantly Worse or Better) and Increasing or Decreasing Trend Test (Sen's Test). These statistical tests are discussed more fully in the report. The statistical analysis used 110 rounds of field sample data collected between February 1973 and October 2003. The collection of data was not identical for each monitoring Site and contaminant, however, and the number of samples collected from individual monitoring sites varied widely. At least four samples (i.e., data points) from a sampling location are required to run the statistical tests; therefore, sites with less than four samples could not be included in the statistical analysis. Data was analyzed from the samples collected from 87 monitoring sites identified in Table 2. The analysis did not include all contaminants of concern but focused on the contaminants of concern identified in Wisconsin Department of Health and Family Services, "Public Health Assessment," September 6, 1994. These contaminants are benzene, 1,2-dichloroethane, 1,2-dichloropropane; tetrachlorethylene; trichlorethylene (TCE); vinyl chloride; chromium and lead.

Based upon this partial list of contaminants of concern, several conclusions have been made.

When compared to the Wisconsin Enforcement Standard (which is equivalent to the Federal MCLs, several contaminants exceed the Upper Confidence Limit (UCL) in at least one sampling location. These contaminants are benzene, chromium, lead and vinyl chloride.

Exceedences for all four of the contaminants were, in many cases, several orders of magnitude greater than the clean-up standards. When compared to the Wisconsin Preventative Action Limits (PALs), which are lower than the Enforcement Standards (ESs), all eight of the contaminants of concern exceeded the PALs at a number of locations. There are 205 exceedences of PALs as compared with 40 exceedences of the Wisconsin ESs. However, the PAL for many of the contaminants was below the detection limits of the contaminants, which resulted in exceedences even though the contaminant was undetected at a location. In order to compare the concentrations with the PAL, the detection limits must be lowered to below the PAL, if possible. It is recommended that the QAPP be revisited to address this issue among others.

Based upon the Comparison to Baseline Test, contamination was found to be worse (as of 10/03) for vinyl chloride at sampling location E93D. For the other seven constituents, the contaminant was better as of October 2003, in at least one sampling location.

Based upon the Sen's Test, none of the eight constituents has contamination that was increasing at any location, and five of the constituents were decreasing of October 2003 in at least one well.

The results of the statistical analysis for individual wells suggest that, while some of the cleanup standards are exceeded and significant contamination exists at the Site, contamination in groundwater is lessening in some cases. One well at E93 D is getting worse for vinyl chloride contamination.

Four of the contaminants of concern were not found to exceed the clean-up standard in any of the sample locations. In addition, no increasing trends were identified for these contaminants, and the most recent samples were not above the baseline UPL (Upper Prediction Limit) of these contaminants. Provided the wells included in this analysis are locations within the contaminant source area, there is evidence that these contaminants are below the clean-up criteria for the Site and consideration can be given to reducing the monitoring for them. This presumes that none of the contaminants are degradation products of one of the other contaminants of concern.

It recommended that the groundwater monitoring program be re-examined for the on-Site areas to make them more effective and that the off-Site groundwater monitoring network be expanded.

History of Private Well Issues

Private well sampling has been conducted at several locations in the past by the PRPs as well as the WDNR, WDHFS, and the U.S. EPA. In addition, some of the private wells are included in the sampling events conducted as Operation and Maintenance Monitoring (as required in the Sampling and Analysis Plan). In 1985-86, based upon detection of off-Site contamination, several residents were provided an alternative source of water.

New information became available in late 1997 and early 1998 indicating that contamination was present in downgradient residential wells.

In 1997, vinyl chloride was detected in five private wells used for drinking and two wells used for outdoor activities (i.e., lawn sprinkling and water for animals). Levels of contamination in the wells ranged from 0.2 to 2.8 ppb. U.S. EPA has established a remedial action objective of 0.2 ppb in the ROD and 1.8 ppb Removal Action Level, which requires that when this level is found in drinking water, an alternate source of clean, safe drinking water be found. Following the detection of contamination in the wells, the PRP Group provided bottled water to affected residences and offered to provide and install whole house water treatment systems on homes with wells found to be contaminated. Most property owners with private wells containing- contamination declined the offer of the treatment system.

Between January 14, 1998, and March 17, 1998, several water samples were collected at residences located near the Site by the WDNR and tested for VOCs. Levels of vinyl chloride were found and ranged from 1 ug/L to 2.8 ug/L. Levels of cis-1,2-dichloroethylene was reported at one residence at 1.9 ug/L. The vinyl chloride level in water samples at two residences Exceeded the federal drinking water standard of 2 ug/L.

In March 1998, WDNR collected water samples from selected private wells and tested for the presence of VOCs. Residences whose wells were found to be contaminated were contacted in March 1998, notifying them that the water exceeded state and federal drinking water standards and advising them to seek an alternate water source (such as bottled water) for drinking and cooking and to restrict use of the private well supply. A follow-up letter was also sent by the Wisconsin Department of Health and Family Services. The PRPs agreed to provide bottled water until an alternative form of water could be provided.

On January 7, 1999, U.S. EPA sent a letter to the PRPs requiring that a work plan be submitted for municipal water hook-up to the affected homes and for any necessary investigation to define the nature and extent of contamination downgradient from the historical disposal areas. The U.S. EPA required that the work plan be submitted pursuant to Section XIII of the 1995 UAO since levels of vinyl chloride detected in the residential wells exceeded the Performance Standard required by the ROD. The work plan was required within 30 days of receipt.

After identification, and until these residents were hooked up to the municipal water system, the owners were advised by WDNR to seek an alternate drinking water source (such as bottled water) for drinking, cooking and bathing and to restrict the use of the private water well supply to flushing toilets. Based upon these results, the PRPs undertook implementing an extension of the municipal water system to impacted residents. Hook-ups to municipal water were scheduled for late July 1999.

The Respondents also offered aeration units to the impacted residents. Only one of the impacted residents accepted the offer, while the other two chose to rely on bottled water until hook up to the municipal system. In February 1999, PRPs agreed to perform the following activities.

- extend the water main approximately 2,000 feet south from its existing termination on Hillendale Drive to the affected area.
- connect four affected residences (W 208 S8861 Hillendale (A. Vitrano), W 207 S8710 Hillendale (T. Vitrano), W 208 S8903 Hillendale (A. Dyer residence and barn) and W 208 S8903 Hillendale) to the new water main service.
- properly abandon the current private water supply wells at those locations.
- perform annual analysis of samples from water supply wells of three other residences to assess future water quality at those locations for five years or until the residences are connected.

In June 1999, WDNR, on behalf of U.S. EPA and the WDHFS, sent a letter to the affected residences requesting a meeting to discuss the contamination. In October 1999, U.S. EPA issued a public notice (Exhibit 15) explaining the vinyl chloride contamination detected off-Site and explaining that the PRP group, in conjunction with the City of Muskego, would be extending the municipal water lines to the affected residents beginning in November of 1999 and offering to abandon selected private wells. Also, in 1999, U.S. EPA required the PRPs to amend their groundwater monitoring program. (See Exhibit 6) Expansion of municipal water in the area has made this service generally available to those residents closest to the Site to approximately ½ mile

south. There are still residents using private wells south of that area and east of the Site using wells for both potable and notpotable purposes. Although requested by U.S. EPA on several occasions, final documentation has not yet been submitted to U.S. EPA on completion of the municipal expansion work. U.S. EPA is aware, however, that the municipal line was extended to those affected residents whose wells were verified to contain vinyl chloride. However, not all the contaminated wells have been abandoned.

By letters dated January 2, 2001, and March 27, 2001, and as clarified by subsequent meetings, U.S. EPA required that the PRPs submit a work plan and report. As required by U.S. EPA, the document must summarize 1) groundwater data collected during and subsequent to the RI and 2) develop a proposed work plan to fill in data gaps and characterize the nature and extent of off-Site contamination. The goals of this activity are to develop a more comprehensive understanding of overall groundwater flow directions and quality in the vicinity of the Site, especially in downgradient areas, and to expand the groundwater monitoring network.

The U.S. EPA required that the work plan be submitted pursuant to Section XIII of the 1995 UAO. Specifically, U.S. EPA required that the work plan include the following: an update of all private wells in the area within a 2-mile radius of the Site and sampling those at risk; sampling of wells within the County Park; revision of the regular monitoring program to include City Well #7 and several additional residential wells; plans for abandonment of wells which are no longer used and which might serve as a migration pathway for contaminants; summary of the homes that were hooked up to municipal water and the rationale for the hook-ups; providing updated information regarding the current status (permanently abandoned, temporarily abandoned, in service/ not monitored, in service/monitored), and location of private wells and waste mains in the area; providing updated information regarding existing private wells surrounding the Site; providing an extensive electronic database of groundwater data collected by the PRPs whether or not previously reported to the agencies including geologic features; conducting an analysis of the potential for soil vapor intrusion; and conducting an analysis of the groundwater extraction system by submitting a Groundwater Extraction System Performance Review work plan.

Drafts of the expanded groundwater monitoring work plan were submitted on March 9, 2001, June 8, 2001, and January 30, 2004. The work plan has been revised based upon comment letters submitted by U.S. EPA and numerous meetings held between the U.S. EPA, WDNR, WDHFS, and in consultations with the City of Muskego. In summary, the work consists of conducting vertical aquifer profiling of pre-selected off-Site well locations, installation of well nests, and sampling of new wells, along with expanding the existing well network. Discussions are currently underway to finalize the work plan. It is anticipated that the work plan will be approved with modifications this fall and work will start shortly thereafter.

On June 29, 2004, U.S. EPA received a revised expanded groundwater monitoring work plan for the analysis of the groundwater extraction system which is also under review.

As is explained further below, several of the residences have hired a contractor to conduct

independent sampling. During their sampling, vinyl chloride was detected in the residential wells and newly installed piezometers.

Concerns Regarding Municipal Well #7 and Private Residences

A concern exists regarding whether pumping Municipal Well #7 might influence the local groundwater flow direction. In 1997, the City of Muskego hired Layne Northwest to complete a multiple well pump test, a capture zone analysis, and an aquifer vulnerability assessment of City Well #7. Based upon these tests, City Well #7 is not expected to capture groundwater from beneath the Site. However, the concern still exists to more fully understand the hydrogeology and any influence that Well #7 may have on groundwater under the Muskego Site. It may also be prudent to install a monitoring well upgradient of Well #7 to serve as an early warning well.

There are still downgradient private residences which utilize private wells for potable water and other non-potable purposes such as watering. Exhibit 16 includes maps depicting private wells and resident location as of January 1992 and as of January 2004; and existing and former private well identifiers (marked table 2). Exhibit 17 contains graphs depicting contaminant trends on Site. A more comprehensive database of private wells must be obtained in order to assure that none are missed in this process. Further, the plume of contamination must be fully delineated to assure that no future residences will be exposed to contamination.

Concerns Regarding Surface Water

The January 1992 RI report (Warzyn 1992) did not identify surface water as a media of concern. Existing surface water control features and storm sewers prevent surface water runoff to private properties. However, a possible pathway exists if contaminated groundwater discharges to a surface water body.

To address residents' concerns, in August 1999, surface water samples were obtained from five surface water bodies located on three residential properties. These samples were analyzed for vinyl chloride and 1,2-DCE in surface water on these properties. These results were provided to U.S. EPA and WDNR on October 15, 1999 and indicated no quantifiable levels of contamination. Another issue has been recently raised during the Five-Year review. Since the Site was formerly a sand and gravel pit, and the Site resides in the 100-year floodplain, and assuming that the soils beneath the Site are glacial and somewhat permeable, there may have been landfill leachate flows which may have moved laterally and impacted the Fox River. (See Exhibit 18). It is recommended that this issue be further investigated.

Analysis of Institutional Controls at the Site

Institutional Controls (ICs) are required in both the SCOU and the GWOU RODs. Exhibit 19 contains IC Information to this Site.

Institutional Controls

ICs include deed restrictions and land use planning regulations and plans to restrict certain property uses. ICs are required at sites when hazardous substances exist at levels which do not allow for unlimited use and unrestricted exposure (UU/UE) of the property. For this Site, the purposes of the required ICs are to restrict development of the Site and/or installation of water supply wells in the vicinity of impacted groundwater to protect the public from exposures to Site-related contaminations and to protect the integrity of the remedy.

Relevant provision of the SCOU ROD required “deed restrictions and Site controls that prevent access, excavation, disturbance of the cap, and installation of the wells.”

The Scope of Work for the Source Control RD/RA UAO at II.B. Institutional Controls stated (dated 12/1/92) :

Within 60 days after the effective date of the Administrative Order, the Respondents shall implement deed restrictions to prohibit future development (including, on-Site excavations, building construction, drilling, installation of drinking water wells, or other uses of the Site which may be inconsistent with implementation or long term maintenance of the remedial action) for all the Site property which any of them currently own. The Respondents, also within 60 days after the effective date of the Order, shall use their best efforts to implement those same deed restriction on those portions of the Site property which are owned by person other than the Respondents. The deed restrictions regarding future development shall be permanent.

The relevant provision of the GWOU required “deed restrictions and site controls that prevent access, excavation, disturbance of the cap, and installation of the wells.”

The Scope of Work for the Groundwater RD/RA UAO did not further define or require ICs for the Site.

Although the first Five-Year review report stated “[t]he deed restrictions and site controls that prevent access, excavation, and disturbance of the cap or installation of wells are in place,” there is no documentary evidence in the Site files. A letter was sent by U.S. EPA requiring that the PRPs undertake an IC review and provide documentation to the U.S. EPA. (See Exhibit 19). The PRPs have requested clarification of the requirement and discussions are underway with regard to this requirement.

Based upon the limited analysis of ICs for the Site undertaken during this Five-Year review, U.S. EPA has determined that although a restrictive covenant appears to have been placed upon the deed in 1983, it is not in conformance with the ROD requirements since it preceded the date of the RODs, is limited in the duration of time that it is effective, and the language has been clarified by the Site owner in a way that is inconsistent with the ROD.

The Site property is reported to be owned by Waste Management (WMWI) and Mr. Carl Wauer. In 2001, a portion of the Muskego Site was considered for development of a Midwest Power Plant and to possibly utilize the groundwater for their process operations. Although, to the best of U.S. EPA's knowledge, this project is no longer being considered due to the problems faced by the power industry, the issues raised are relevant to the discussion about ICs. The proposed Site was to be located 200 feet north of the old rendering plant lagoon. During its application process, the Wisconsin Power Company and their contractor, RMT, researched the deed restrictions on the Site.

In its research, Midwest Power and RMT provided IC information to U.S. EPA which was included in the application package submitted to Wisconsin Public Service Commission for approval to construct and operate the power plant. Some of the documentation provided in that power plant application was used in the analysis of existing ICs for the Site. In addition, a local citizen group, Citizen Power, Inc. also provided relevant information to the U.S. EPA.

U.S. EPA reviewed a copy of the Warranty Deed for the Site dated October 28, 1983. The deed noted the following: "Grantee will not undertake commercial or residential development of the property for a period of thirty (30) years from the date hereof." The Deed also described the parcel of land.

Also provided in the application were several letters to clarify the land use restrictions contained in the deed restriction. One of the letters, dated June 14, 2001 was a notarized letter from Mr. Carl Wauer which was purportedly recorded with the applicable register of deeds to confirm the intent of the deed restriction and to eliminate any title-related matters regarding the deed restriction as it concerns the proposed site.

In essence, these letters indicated that while the deed restriction limits the commercial and residential development of the property, industrial uses of the property is permitted use per the deed restriction. Specifically, the notarized letter states: "while the deed restriction limits commercial and residential development of the property for a period of thirty (30) years, industrial uses of the property, such as an electric generating plant, is permitted use per the deed restriction."

RMT also reported that they had confirmed with WMWI that a Title Commitment had been provided to Wisconsin Power indicating that no deed restriction existed for the proposed peaking facility Site.

However, a letter was sent to the Mayor by Citizen Power, Inc., dated June 2, 2001. In that letter 30-year deed restriction, it stated: "please note that when Waste Management purchased this property from the Wauers in 1983, they agreed that no commercial or residential development would be allowed on the property before the year 2013. To that end we believe Muskego's current zoning for this parcel is superseded by the aforementioned deed restriction. Therefore, we believe the City of Muskego is legally to automatically reject any future application by Midwest power. Furthermore, we encourage the City to exposure its options to re-zone the is parcel "conservancy", bringing it into conformity with the existing deed restriction currently in effect.

Given the issues identified regarding IC at the Site, follow-up actions are required.

IC Follow-up Requirements.

As previously mentioned, U.S. EPA has requested that the PRPs conduct an IC study to determine whether the necessary ICs are in place and effective. The following steps must be followed:

A) Determination as to what part of Site should be subject to Institutional Controls by obtaining:

- i) legal description (or map) of areas that do not allow unlimited and unrestricted use;
- ii) title search/commitment regarding the current status of the title of these areas;
- iii) copies of encumbrances referenced in Schedule B of the Title Commitment;
- iv) evaluate whether encumbrances would negatively impact the proprietary control and obtain subrogation agreements from any appropriate prior in time owners of such encumbrances.

In addition, potential holders of the proprietary control must be identified.

B) Evaluation of the RODs and UAOs must be made to determine what is required and whether additional steps must be taken to assure the protectiveness and followup with the appropriate documentation. For example, if the IC is an agreement with the owner to restrict land or groundwater use, obtain a current title search/title commitment to confirm its existence and whether it “runs with the land”.

C) Determination of Governmental Controls must be made. Current government controls, such as ordinances, must be obtained and confirmed that they are still in effect and have not been amended.

D) Determination of Proprietary Controls must be made. After a current title search/title commitment is received for evaluation of proprietary controls on the properties, the following must be done: Obtain copies of encumbrances referenced in the title commitment. Evaluation must be made as whether the proprietary control such as restrictive covenant shows up in the chain of title thereby providing notice to future owners of land -and groundwater use restrictions; whether there are any prior in time encumbrances that may negatively impact a proprietary control (e.g. the foreclosure of a prior mortgage may invalidate an IC); whether there are any -subordination agreements needed from holders of prior in time encumbrances; whether there is a grantee or prior owner that “holds” the proprietary control and whether the proprietary controls have been executed appropriately.

E) Determination of other relevant governmental ICs must be made. According to State regulations, the installation of a water supply well in a known contaminated aquifer or within 1,200 feet of the nearest edge of an abandoned landfill is prohibited, unless a variance is granted by the WDNR. In addition, Section NR 812.14 (i)(j) requires that special well casing specifications be met. As is noted on page 23 of the attached July 2004 Special Well Construction Requirements (Exhibit 19) restricts well construction near the Muskego Landfill Site. The special casing area

restriction has been in place since January 2004. The WDNR has placed allowable (by state law) construction restrictions (considered an Institutional Control) for new, replacement, or reconstruction of existing wells. The restriction recommends connection to the existing municipal system, requires that the Department be contacted to obtain updated construction requirements, and requires collection, analysis, and report of water sample results from VOC analysis. Since restrictions are already in place for the required properties, there may be no need for an additional restrictions for this remedy; however that will need to be determined. Enforcement of the water supply well prohibition is dependent on the property owner or well driller contacting the WDNR prior to well installation. Also, the WDNR can grant variances from the prohibition, so the prohibition is not absolute, even if the WDNR is contacted. Based upon limited research, it is not clear when the off-Site wells were put in place. If they were put in place recently, then the installation of these wells might be considered to be a breach of a governmental control.

Potential IC Issues

The following potential issues have been identified associated with ICs for the Muskego Site:

- The restrictive covenant is dated 1983 prior to the requirements dictated by the RODs;
- Apparently the deed restriction is only valid for thirty years and does not run with the land; restrictive covenant only covers approximately 20 acres;
- The deed restriction has been interpreted by the former land owner to allow industrial uses;
- Government agencies have not been contacted or kept up to date on interpreting land use restrictions;
- The deed restriction does not limit groundwater usage; and
- Local and State Officials must be contacted to assure that they have up to date information such as maps of known contamination areas (i.e. give permitting authority a map of groundwater contamination plume with property identification plots so they can deny well drilling permits in the areas of known contamination).

Recommendations/ Requirements as determined by Second Five-Year Review.

Along with those followup recommendations and continuing obligations identified during the first Five-Year review, the following requirements were identified from the second Five-Year review.

*Need: Annual Progress Reports.

In accordance with the GWOU UAO SOW, annual progress reports are required:
The relevant provision is as follows:

D. The Respondents shall submit annual progress reports for approval by U.S. EPA, in consultation with the WDNR, after completion of the Five-Year Review. The annual progress reports shall include a summary of all groundwater monitoring data for the project. This summary shall include a description of any trends or projections of groundwater levels and a

comparison to groundwater cleanup levels for the project. The annual progress report shall include any recommended additional actions or modifications to the groundwater system to achieve groundwater cleanup goals.

Recommendation: Annual Progress Reports are to be submitted

*Need: Electronic Data is needed by U.S. EPA

Data is needed by U.S. EPA electronically to be able to keep a current database. WDNR already receives information electronically.

Recommendation: Electronic data is to be submitted to U.S. EPA

* Need: The City of Muskego needs more frequent updates.

Recommendation: Include the City of Muskego in the distribution of the quarterly progress reports.

Summary of Recommendations From Second Five-Year Review:

1. PRPs are to finalize Draft Responses to Comments for the draft Pilot Scale ISVE Test Report and submit them to the agencies. Agencies will decide whether to approve an upgrade to the landfill gas collection system in lieu of the ISVE installation system;
2. Continued operation, monitoring and adjustment of the landfill gas extraction system and reporting on operations in the progress reports;
3. Continued operation, monitoring and adjustment of the leachate collection system and reporting on operations in the progress reports;
4. Continued operation and maintenance of the groundwater extraction system, including the extraction wells and discharge piping network and reporting on operations in the progress reports;
5. Continued routine environmental monitoring, as described in approved decision documents, and any additional environmental monitoring identified as part of the implementation of municipal water supply to residents or required by the U.S. EPA at the Site;
6. Provide documentation of implementation of connection of municipal water supply by Respondents to identified impacted residents in summer of 1999;
7. Evaluation of effectiveness of extraction wells and system in place to ensure that the remedy is most efficient at containing contaminants on-Site and to prevent migration of contaminants off-Site. Also, to determine if expansion of the system is necessary to make progress towards cleanup standards;
8. Perform data entry of past and present data into a database that can effectively model the

groundwater and contaminant flow and site situation, as approved by U.S. EPA;

9. Perform On going evaluation, not just at five-year review;
10. Conduct an institutional controls study and follow-up. After the completion of an IC study, an IC implementation and monitoring plan will be developed to prevent exposure to existing contaminant levels. This plan will include contacting the state and local governments to assure new off-Site wells are carefully considered;
11. U.S. EPA will complete review of the Expanded Groundwater Monitoring Work Plan submitted by the PRPs earlier in 2004 and will monitor its implementation, which is scheduled to begin in the fall of 2004. After approval of work plan by the agencies, PRPs will conduct additional off-Site groundwater work including additional investigations in the area south and east of the Site to confirm groundwater flow direction in the area of the Site and to collect additional information on groundwater quality off-Site;
12. PRPs will upgrade groundwater monitoring systems to provide early warning of potential impact to downgradient residences and the municipal wells;
13. Sample off-Site wells including residential and county park wells;
14. Perform abandonment of contaminated residential wells;
15. Perform abandonment of deep (former manufacturing wells) on-Site wells;
16. Submission of annual reports;
17. Perform necessary landfill cap repairs (minor) prior to the winter season;
18. Electronic data is to be submitted to U.S. EPA;
19. Include the City of Muskego in the distribution of the quarterly progress reports;
20. A more comprehensive database of private wells must be obtained in order to assure that none are missed in this process;
21. Investigate whether flood protection for the landfill cap is necessary;
22. Investigate whether vapor intrusion may be affecting residences; and
23. Investigate whether landfill leachate flows moving laterally may have impacted the Fox River.

Other Comments: Once the expanded groundwater monitoring work plan is approved, the PRPs

will gather information, with oversight by U.S. EPA, to address the existing data gaps so that U.S. EPA can make decisions about what additional measures may be necessary and about whether a ROD Amendment or ESD is required.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents? Yes.

Remedial Action Performance

The primary exposure pathway at the Site was direct contact and ingestion of contaminated surface soil, and potential pathways existed for consumption of leachate/groundwater on-Site and off-Site consumption of groundwater contaminated with vinyl chloride. The capping of the landfill provides a barrier to the primary exposure pathway, and the cap was intact and had no breaches during the O&M inspections and during the Five-year review Site inspection on July 15, 2004.

As indicated by the results of Stat analysis, the remedy appears to have been effective in stabilizing the groundwater contamination at the Site. The concentrations of contaminants in groundwater generally are continuing to be stable or to decline.

With regard to the off-Site contamination, U.S. EPA believes that the on-Site operations are functioning properly and that previous operations may have left a residual area of contamination that was not detected until recently. Vinyl chloride is typically found as a breakdown product, so it is believed that as compounds from previous operations are broken down, this vinyl chloride has come through the system. However, several of the assumptions made in the RODs are in question. In the ROD, the assumption regarding the number of private off-Site wells appears to be erroneous. In addition, the ROD assumed that the contamination in the Old Fill Area was not as significant a threat to potential receptors as the contamination in the Southeast Fill; therefore, the extraction system was only installed in the periphery of the Southeast Fill Area (Remedy 4 A). It now appears that the Southeast Fill area was a potential source of contamination that has now migrated off-Site. Based upon these questions and the characterization work that will take place, U.S. EPA will look at the remedy to determine if amendments additional response actions are required.

In summary, the data gathered during the Five-Year review indicate that the remedy continues to function as designed. However, the issue of off-Site contamination must be addressed. Further monitoring and investigation will offer more information on this matter and is also being addressed as part of the recommendations for this Five-Year review.

System Operation and Maintenance

The remedy for the Site includes a landfill cap, gas extraction system, a groundwater extraction system and a series of monitoring wells. As indicated in more detail above, the O&M is effective at maintaining the engineered systems on the Site.

Opportunities for Optimization

Since there are only a few operating systems at the Site, there are limited opportunities for optimization of O&M. The PRPs have indicated that the leachate collection system may be considered for optimization in the future. In addition, an upgrade is being considered to the landfill gas collection system. This upgrade may permit elimination or optimization of the ISVE system.

Early Indicators of Potential Issues

There are two indicators of potential issues. First, based upon physical observations it was determined that minor erosion of the landfill cap is occurring. It was reported that this cap will be repaired prior to the winter season and would have been already but for the wet spring and summer.

Second, the detections of contaminants in off-Site downgradient wells is an indication of a potential issue. In order to address this issue, additional work is required. U.S. EPA is currently reviewing Revision 2 of the Expanded Groundwater Monitoring work plan to address this matter. Once the work plan is approved, the PRPs will conduct the work and U.S. EPA will provide oversight for the investigation of the off-Site groundwater contamination. The work is tentatively scheduled to start in October 2004.

Implementation of Institutional Controls and Other Measures

The engineering controls on-Site appear to be adequately maintained.

In the first Five-Year Review Report, it was reported that the deed restrictions and Site controls that prevent access, excavation, and disturbance of the cap or installation of wells are in place.

The RODs require ICs as an additional layer of protection regarding the integrity of the landfill cap and prevent exposure to contaminated groundwater. Since U.S. EPA could not verify that ICs are in place, U.S. EPA has required that the PRPs conduct an IC study.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid? Yes.

Remedial Action objectives and cleanup goals for the Final (GWOU) Remedy are still valid. They are as follows:

- * Reduction of the migrations of contaminants of concern from the Fill Area.
- * Reduction of the concentrations of contaminants of concern in groundwater at the Site to acceptable risk levels.
- * Reduction of groundwater concentrations of contaminants of concern at the Site to meet Federal Maximum Contaminant Levels (MCLs), state NR 140 Enforcement Standards (ESs) and

Preventative Actions Limits (PALs) at and beyond the waste boundaries (edge of waste).

* Return useable groundwater at the Site to beneficial use, when practicable, within a timeframe that is reasonable given the circumstances of the Site.

*Further evaluation of the groundwater and plume characteristics in the Non-Contiguous Fill Area and downgradient of this area of this area during pilot scaled tests.

Although there appear to be no present exposures to groundwater contamination, since all residences in the vicinity of the Site with documented contamination have been connected to public water supply, a potential exists for future exposure through ingestion. In addition, it was reported that several residences in the contaminated off-Site areas retained private wells for non-potable uses such as watering their gardens and yard. These issues will be addressed by the recommendations made in this review.

Changes in Standards and To Be Considered Criteria

There have been no changes in ARARs or To Be Considered (TBC) criteria since the start of remedial construction at the Site.

Changes in Exposure Pathways

The actual presence of off-Site groundwater contamination represents an additional potential completed exposure pathway at the Site. In addition, there is evidence of development in the area, thereby further increasing possible exposure pathways.

Changes in Toxicity and Other Contaminant Characteristics

Neither the toxicity factors for the contaminants of concern nor other contaminant characteristics have changed in a way that could affect the protectiveness of the remedy.

Changes in Risk Assessment Methods

Standardized risk assessment methods have not changed in a way that could affect the protectiveness of the remedy.

Expected Progress Toward Meeting Remedial Action Objectives

The Remedial Action Objectives identified in the ROD for capping of the landfill to block the direct contact pathway and preventing the further degradation of groundwater from the cap have been met or are progressing in a manner that is acceptable and will result in the Remedial Action Objectives being met within a reasonable time frame (continuing reductions in vinyl chloride concentrations in groundwater monitoring wells). The monitoring programs will continue to ensure that any changes in contaminant levels will be detected and addressed, if necessary. However, the following Remedial Action objectives may not be yet met.

* Reduction of groundwater concentrations of contaminants of concern at the Site to meet Federal Maximum Contaminant Levels (MCLs), state NR 140 Enforcement Standards (ESs) and Preventative Actions Limits (PALs) at and beyond the waste boundaries (edge of waste).

* Return useable groundwater at the Site to beneficial use, when practicable, within a timeframe that is reasonable given the circumstances of the Site. Therefore, these issues will be addressed by performing additional work.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy? Yes.

New information has become available which may affect the protectiveness of the remedy for the Site. Off-site groundwater contamination has been identified and needs to be further studied and addressed as appropriate in order to assure the protectiveness of the remedy. Also the vapor intrusion pathway needs further study. This study would be prudent given that 1) the monitoring network is inadequate, 2) there is potentially VOC contamination at newly constructed wells as well as old homes in the vicinity of the Muskego landfill, and 3) there have been the carcinogens (vinyl chloride and benzene) identified in the past at the Site, and 4) private residential wells have been observed to have vinyl chloride found in them. The institutional controls required by the RODs could not be confirmed to be in place in compliance with the ROD requirements.

Institutional Controls

As is discussed more fully above, Institutional Controls are required in both the SCOU and the GWOU. Although the first Five-Year Review Report stated "The deed restrictions and site controls that prevent access, excavation, and disturbance of the cap or installation of wells are in place," there is no documentary evidence in the Site file. A letter was sent by U.S. EPA requiring that the PRPs undertake an IC review and provide documentation to the U.S. EPA. The PRPs have requested clarification of the requirement and discussions are underway with regard to this requirement. After the completion of an IC study, an implementation and monitoring plan must be completed.

VIII. Summary of Issues

	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. ISVE Pilot Test Report must be finalized By PRPs and a Decision made by the Agencies as to the recommendations	N	N
2. The landfill gas extraction system must continue		

to be operated and reported upon to maintain effectiveness of the remedy	N	N
3. The leachate collection system must continue to be operated and reported upon to maintain effectiveness	N	N
4. The groundwater collection system must continue to be operated and reported upon to maintain effectiveness of the remedy	N	N
5. Routine environmental monitoring must continue to assure the protectiveness of the remedy	N	N
6. Implementation of connection of municipal water supply by Respondents to identified impacted residents in summer of 1999 must be documented	Y	N
7. Review of effectiveness of extraction wells and system in place to ensure that the remedy is effective at containing contaminants on-Site and to prevent migration of contaminants off-Site and whether additional measures are needed to assure protectiveness of the remedy	N	Y
8. Continue data entry of past and present data into a database that can effectively model the groundwater and contaminant flow and Site situation	M	Y
9. Continued evaluation of the Site is necessary	N	Y
10. IC Study is needed to document that ICs have been implemented; a follow-plan is needed to address deficiencies	M	Y
11. A plan is needed to confirm the conceptual Site model and to collect additional information in order to fully characterize off-Site groundwater conditions	M	Y

12. Monitoring systems must be efficient to perform early warning of any off-Site contamination which may impact a private or municipal well	M	Y
13. Quality of off-Site wells including residential and county park wells must be confirmed	M	Y
14. Contaminated residential wells must be abandoned after sampling	M	Y
15. Deep on-Site wells (former manufacturing wells) must be abandoned after sampling	M	Y
16. Quality of the residential wells must be confirmed; contaminated residential wells must be abandoned after sampling and alternative water supply must be in place	M	Y
17. PRPs must submit annual reports to the Agencies as outlined in the UAO SOW	M	Y
18. U.S. EPA is not receiving the monitoring data in an electronic format	Y	Y

19. The City of Muskego is not receiving frequent enough Site updates	Y	Y
20. A comprehensive database of private wells is needed	Y	Y
21. Minor landfill cap repairs are necessary prior to the winter season.	N	Y
22. Investigate whether flood protection for the landfill cap is necessary.	N	Y
23. Investigate whether landfill leachate flows moving laterally may have impacted the Fox River	M	M

Y=yes; N= no; M=maybe

The above issues correlate to the Five-Year review recommendations.

Based on the monitoring reports and physical observations made during the inspections of the Site, there are no issues with regard to the operating systems that currently affect the protectiveness of the remedy outlined in the ROD. The Remedy appears to be functioning adequately. The integrity of the cap in place is good and the groundwater monitoring wells are in well maintained.

The presence of vinyl chloride in the off-Site groundwater could affect the future protectiveness of the remedy if the plume were to expand to other private wells or Municipal Well #7. There are indications that although the groundwater contamination on-Site is generally stable or declining, that there is contamination off-Site that is not fully characterized and may not be adequately controlled. U.S. EPA will address the issues through investigation and, if necessary, by requiring additional response actions.

IX. Recommendations and Follow-up Actions

Issue	Recommendations/Follow-up actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)
PRPs are to required to finalize Draft Responses to Comments for the draft Pilot Scale ISVE Test Report and will submit them to Agencies. Agencies will decide whether to approve an upgrade to the landfill gas collection system in lieu of the ISVE installation system	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2004	N-current M-future
Continued Operation & Monitoring and adjustment of the landfill gas extraction system and reporting on operations in the progress reports	Needs to be continued	PRPs	U.S. EPA	start-2004 complete-2004	N-current M-future

Continued operation & monitoring and adjustment of the leachate collection system and reporting on operations in the progress reports	Need to be continued	PRPs	U.S. EPA	start-2004 complete-2009	N-current M-future
Continued operation & maintenance of the groundwater extraction system, including the extraction wells and discharge piping network and reporting on operations in the progress reports	Needs to be continued				

Routine environmental monitoring, as described in approved decision documents, and any additional environmental monitoring identified as part of the implementation of municipal water supply to residents or required by the U.S. EPA at the Site	Needs to be continued	PRPs	U.S. EPA	on-going	N-current M-future
Document how the municipal water supply was connected to the residents in the summer of 1999	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2004	Y-current Y-future
Evaluate effectiveness of extraction wells and system	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2004	N-current M-future

Perform data entry of past and present data into a database that can effectively model the groundwater and contaminant flow and Site situation	Needs to be continued	PRPs	U.S. EPA	on-going	N-current M-future
Perform on going evaluation, not just at Five-Year review	Needs to be continued	PRPs	U.S. EPA	on-going	N-current M-future
Complete Institutional Controls Study and Follow-up, as needed	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2005	M-current Y-future
Complete review of the <i>Expanded Groundwater Monitoring Work plan</i> submitted by the PRPs to characterize off-Site groundwater quality	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2004	M-current Y-future

After approval of work plan by the agencies, PRPs will conduct additional off-Site groundwater work	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2004	M-current Y-future
Upgrade groundwater monitoring systems to provide early warning of potential impact to downgradient residences and the municipal wells	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2004	M-current Y-future
Sample off-Site wells including residential and county park wells	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2004	M-current Y-future
Abandonment of contaminated residential wells	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2004	M-current Y-future
Sampling and abandonment of deep (former manufacturing wells) on-Site wells	Needs to be implemented	PRPs	U.S. EPA	start-2005 complete-2008	M-current Y-future

Submission of quarterly and annual reports	Needs to be implemented	PRPs	U.S. EPA	start-2005 complete-2008	N-current Y-future
Minor landfill cap repairs are necessary prior to the winter season	Needs to be implemented	PRPs	U.S. EPA	start-2004 complete-2005	M-current Y-future
Electronic data is to be submitted to U.S. EPA	Needs to be implemented	PRPs	U.S. EPA	start-2005 complete-2008	N-current Y-future
Include the City of Muskego in the distribution of the quarterly progress reports	Needs to be implemented	PRPs	U.S. EPA	start- 2004	N-current N-future
A more comprehensive database of private wells must be obtained in order to assure that none are missed in this process	Needs to be implemented	PRPs	U.S. EPA	start-2005	M-current Y-future
Upon approval of work plan, complete Review of Groundwater treatment system	Needs to be implemented	U.S. EPA	PRPs	start-2004 complete-2005	N-current N-future

Investigate whether flood protection is necessary for landfill cap	Needs to be implemented	PRPs	U.S. EPA	start-2005 complete-2009	N-current Y-future
Study whether vapor intrusion is impacting residences	Needs to be implemented	U.S. EPA	PRPs	start-2004 complete-2005	N-current M-future
Study whether landfill leachate flows moving laterally may have affected the Fox River	Needs to be implemented	U.S. EPA	PRPs	start-2004 complete-2005	M-current M-future

Y = yes; N = No; M = Maybe

X. Protectiveness Statement

Protectiveness Statement(s):

U.S. EPA is deferring the short-term protectiveness determination at the Muskego Sanitary Landfill Site because more information is needed to make an accurate protectiveness determination. Although it appears that there is no current exposure to any contaminants, the evidence does not currently exist to definitively make that statement due to the fact that the off-Site groundwater contamination has not been fully characterized. Although portions of the final remedy have not yet been fully implemented, the sampling data presented generally indicates stable to declining groundwater contamination values on-Site; however, the selected remedies do not address the post-ROD discovery of off-Site groundwater contamination which may have affected or may threaten area wells and which may threaten Municipal Well #7. In the last 5 years, off-Site residence with evidence of vinyl chloride contamination were hooked up to the municipal water. There is no evidence that off-Site residents are presently exposed to Site-related groundwater contamination because the water mains have been extended to areas which were previously known to have contamination; however, numerous other private wells and Municipal Well #7 are all downgradient of the Site. Follow-up actions will be taken to develop adequate data and require additional actions as necessary. It is anticipated that the short-term protectiveness determination will be made within 15 months after the additional information is collected and analyzed.

The remedy is not protective in the long-term because the RODs do not address the newly found contamination. Based on an initial review of available information, the Institutional Controls could not be confirmed to be in place. In order for the remedy to remain protective in the long term, engineering controls and ICs that restrict the use of Site property and groundwater and that prohibit drilling of groundwater wells must be in place to prevent exposure to contaminants.

U.S. EPA is deferring the short-term protectiveness determination at the Muskego Sanitary Landfill Site because more information is needed to make an accurate protectiveness determination.

Although it appears that there is no current exposure to any contaminants, the evidence does not currently exist to definitively make that statement due to the fact that the off-Site groundwater contamination has not been fully characterized. Although portions of the final remedy have not yet been fully implemented, the sampling data presented generally indicates stable to declining groundwater contamination values on-Site; however, the remedy does not account for the inadequate characterization of off-Site groundwater contamination which may have affected area residents or whether Municipal Well 7 is at-risk for contamination. In the last 5 years, off-Site residence with evidence of vinyl chloride contamination were hooked up to the municipal water. There is no evidence that off-Site residents are presently exposed to off-Site groundwater contamination because the water mains have been extended to areas which were previously known to have contamination; however, numerous other private wells and Municipal Well #7 are all downgradient of the Site. Follow-up actions will be taken to address inadequate data. It is anticipated that the short-term protectiveness determination will be determined within 15 months after the additional information is collected and analyzed.

Other Comments:

Once the expanded groundwater monitoring work plan is approved, the PRPs will conduct the work and U.S. EPA will provide oversight for the investigation of the off-Site groundwater contamination. This investigation will address the existing data gaps and U.S. EPA can make decisions whether, in consultation with WDNR, whether further response activities are necessary.

XI. Next Review

Based upon the recommendations and follow-up actions, additional sampling activity, investigation, and evaluation will be undertaken following this second Five-Year review. In addition, the routine operation and maintenance and monitoring for the Muskego Site will be continued throughout the next five years. The Third Five-Year Review Report is due on September 2009, which is five years from the date of signature of this Five-Year Review Report.

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**EXHIBIT 1
SITE CHRONOLOGY**

Muskego NPL Site Chronology

- Property was operated as an animal rendering plant and gravel quarry	1940- 1954
- Wauers received a permit to operate a public dump; Site was operated by Acme Disposal which then became Waste Management Inc.	1954
- Site was ordered closed by WDNR	1975
- Site Discovery	4/1/79
- Bottled Water supplied to residents	1982
-PA/SI Completed	5/1/83
- Proposed Listing of Site on the NPL	9/8/83
- Partial Leachate collection system is retrofitted on landfill	1982
- PRPs purchased property where contamination was noted	1983
- Final Listing of Site on the NPL	9/21/84
- Partial Methane Collection system is retrofitted on landfill	1985
- City of Muskego extended water mains to certain parts of the area	1985
- Issuance of RI/FS Administrative Order on Consent	8/14/87
- RI/FS Initiated	8/14/87
- U.S.EPA ordered Uao to WMWI to conduct removal of drums	1/1991
- PRP Removal Initiated related to drum trench	4/3/91
- PRP Removal completed	5/ 1991
- Interim Action - SCOU FS prepared	09/1991
- SCOU RD/RA UAO Issued	12/9/92
- Proposed Plan Issued for the Groundwater Operabel Unit (GWOU)	1/15/92
- Ecological Risk Assessment Completed	6/9/92

- RI/FS Completed for SCOU	
- SCOU ROD issued by U.S. EPA	6/12/92
- SCOU UAO is issued	12/9/92
- Effective Date of SCOU UAO	12/29/92
- Draft RD/RA Workplans submitted to the Agencies	1/22/93
- SCOU RD Start	1/15/93
- GWOU FS completed	03/1993
- U.S. EPA Approval of Final Design Package (Except for interim Groundwater Monitoring)	9/18/93
-Conditional Approval of Final SCOU Remedial Design -Final (100%) (i.e, PRP RD Completed)	10/7/93
- SCOU RA Start	10/7/93
- Start of Physical On-Site Construction	10/18/93
- PRP Removal Completed	12/21/93
- Approval of the Interim Groundwater Plan Approval	3/7/94
- Completion of First Round of groundwater Sampling under IGMP	4/28/94
- Proposed Plan GWOU issued	10/31/94
- SCOU RA work completed (except ISVE)	10/94
- Public Health Assessment Completed	1994
- GWOU UAO Issued by U.S, EPA	6/6/95
- Effective Date of GWOU UAO	6/26/95
- RI/FS Completed and SCOU ROD issued	2/2/95
- Draft RD/RA Work Plans Submitted to U.S.EPA/WDNR [Agencies]	7/21/95
- Construction Completion Report for SCOU Submitted	12/4/95

to U.S. EPA and WDNR for review

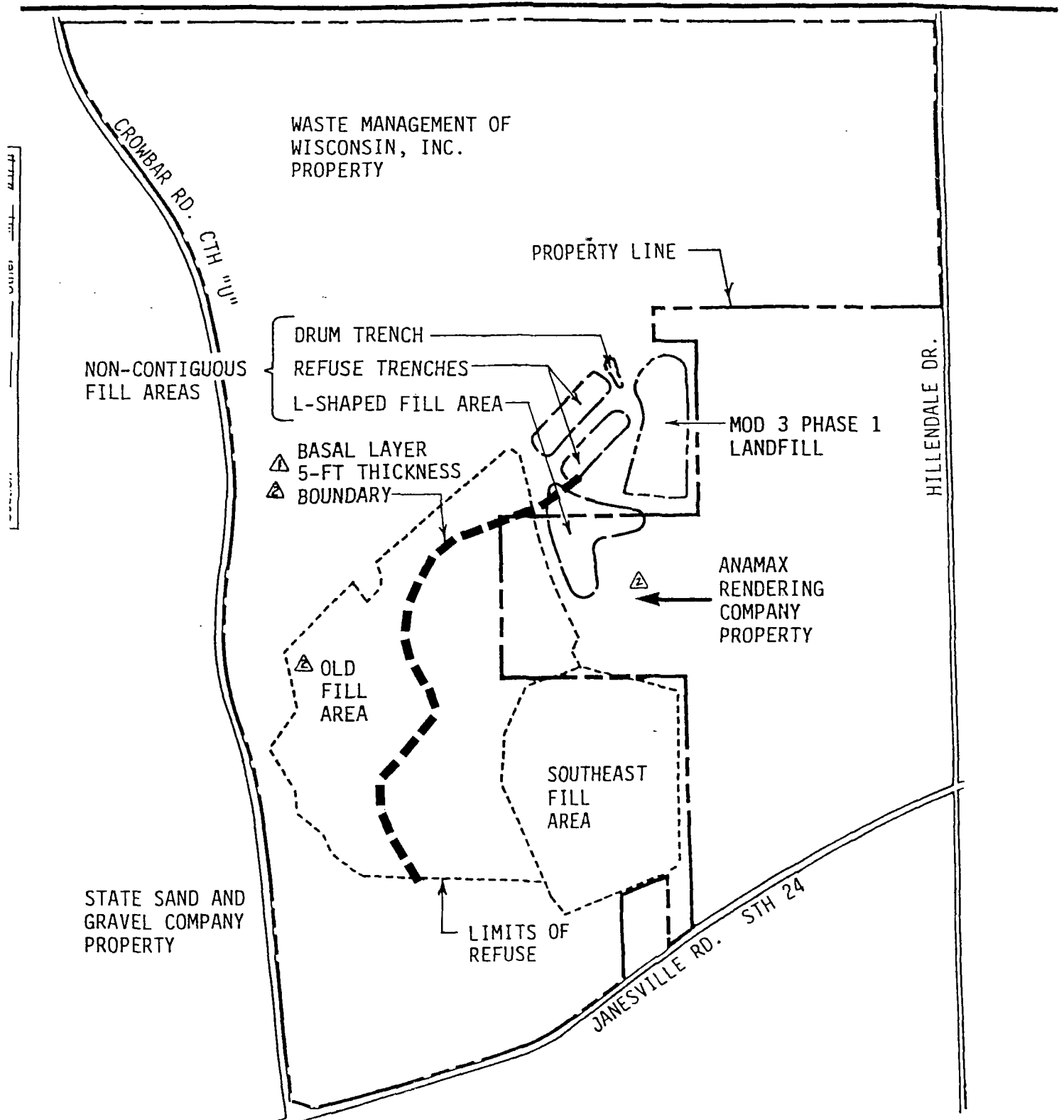
- Approval of Construction Completion Report by U.S. EPA and WDNR	7/8/96
-Pre-Design/Pilot Study Field Activities started	8/21/96
-Preliminary (35 %) Remedial Design-	5/6/97
-Preliminary (35%) Remedial Design submittal	5/16/97
-Pre-Final (95%) Design Remedial Design Report Submitted to U.S. EPA	7/30/97
- Preliminary Close-out Report	9/19/97
-Conditional Approval of Final Remedial Design -Final (100%) (i.e, PRP RD Completed)	9/26/97
-Remedial Design Report submitted to U.S. EPA	10/14/97
-GWOU RA Construction Completion Report submitted to U.S. EPA	12/4/97
- GWOU Conditional Approval of GWOU final RA Construction Documentation Report	4/13/98
-Draft ISVE Pilot Scale Report Submitted to U.S. EPA and WDNR for review	6/22/98
- Comment Letter on draft ISVE Pilot Test Report issued by U.S. EPA	2/25/99
- Off-site groundwater contamination confirmed in private wells	1998?
- First Five Year Review Completed	8/2/99
- U.S. EPA imposed requirement to submit a work plan for addressing affected private residences with contamination in wells	1999
- Bottled Water Provided to Affected Residents with Contamination in Wells	1999
- Municipal Water Line Extensions Undertaken	12/1/99
- U.S. EPA Requirement to Submit a work plan for characterization of off-site Groundwater contamination and expanding the monitoring work plan	2001
- Submission of Revision 2 of Expanded Groundwater Monitoring Work plan	2004

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**EXHIBIT 2
SITE LOCATION MAP**

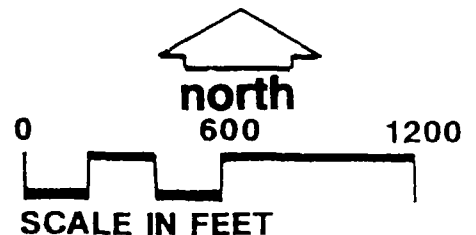
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EXHIBIT 3
MAP DEPICTING WASTE DISPOSAL AREAS



NOTES

1. BASE MAP DEVELOPED FROM DRAWING 13527-7 PREPARED BY WARZYN ENGINEERING INC., DATED APRIL 1989.
2. LOCATIONS SHOWN ARE APPROXIMATE. FOR DETAILED SITE INFORMATION REFER TO THE REMEDIAL INVESTIGATION REPORT, MUSKEGO LANDFILL, DATED FEBRUARY 1992, PREPARED BY WARZYN INC.



SITE FEATURES MAP

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
MUSKEGO SANITARY LANDFILL
WASTE MANAGEMENT OF WISCONSIN, INC.
CITY OF MUSKEGO, WAUKESHA COUNTY, WISCONSIN

Drawn

DLF

Checked

MAL

App'd.

KEB

Revisions

- △ REVISED BASAL LAYER BOUNDARY - LCL-8-13-91 - MAL
- △ REVISED ITEMS SHOWN - HLT-10-27-91 - MAL

Date

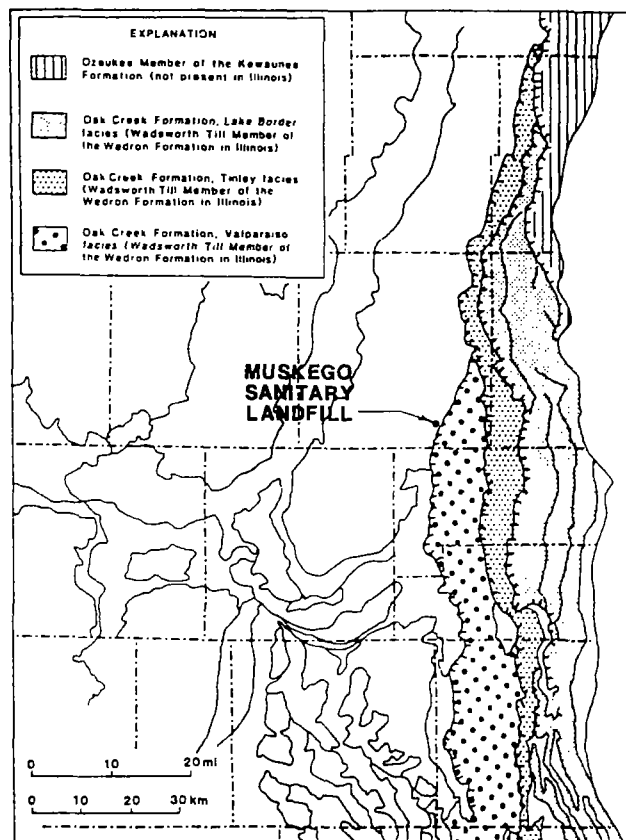
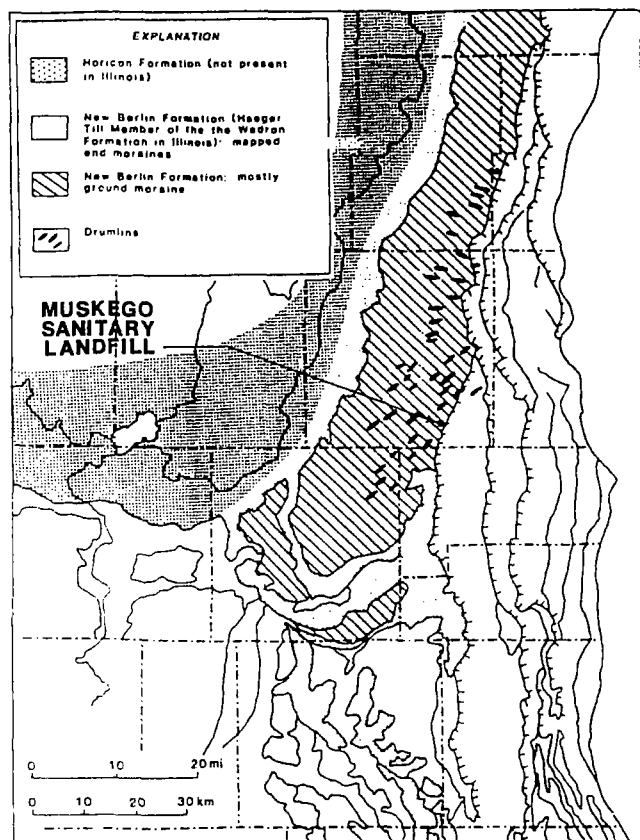
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13527

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**EXHIBIT 4
MAP DEPICTING STRATOGRAHIC UNITS
OF SOUTHEASTERN WISCONSIN**



NOTES

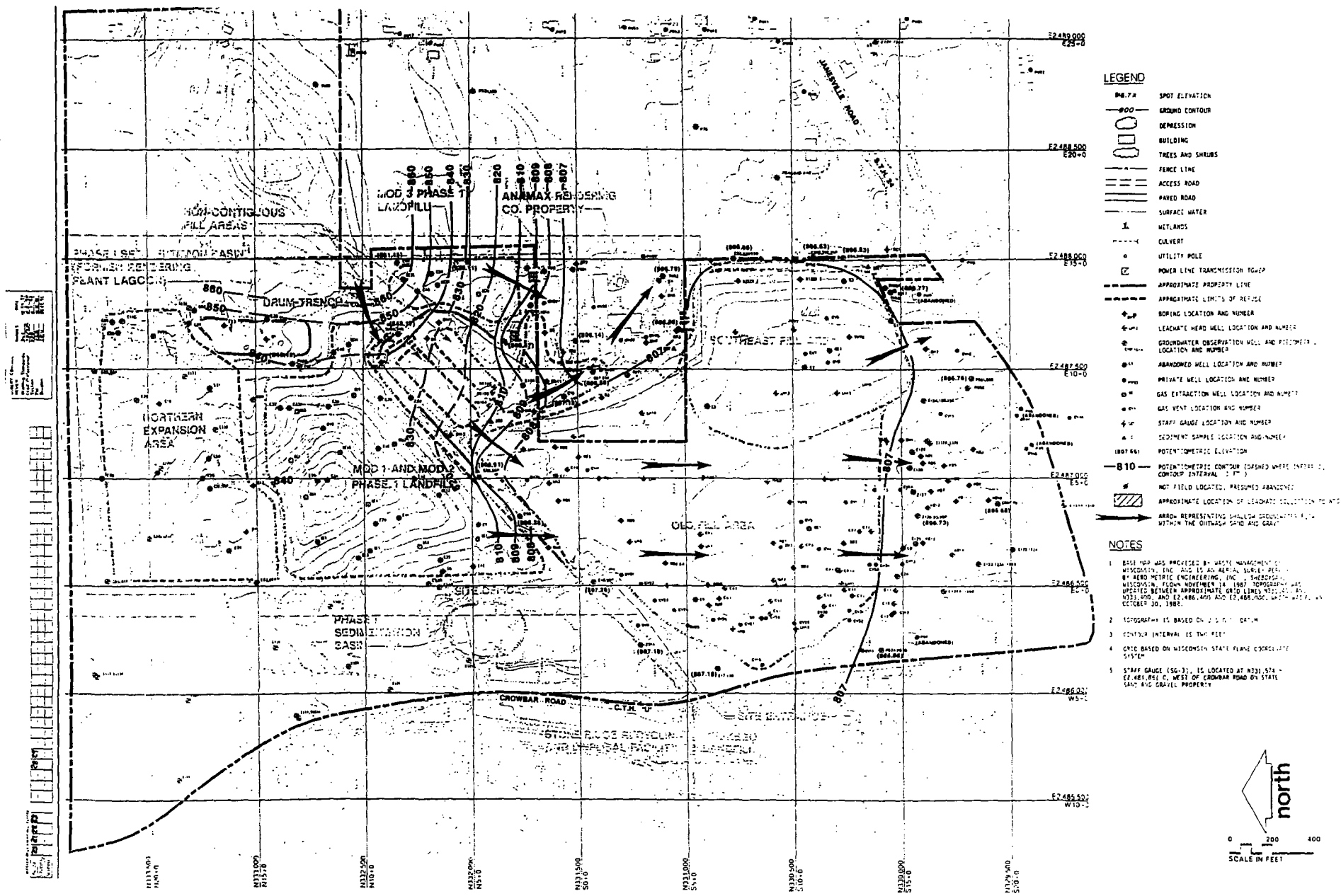
1. GLACIAL GEOLOGY OF PART OF SOUTHEASTERN WISCONSIN SHOWING MORAINES AND COUNTY AND DISTRIBUTION OF WISCONSINAN ROCK STRATIGRAPHIC UNITS. MORAINES AS SHOWN REPRESENT THE INTERPRETATIONS OF RELATIONSHIPS MAPPED BY SEVERAL WORKERS. HACHURED LINES REPRESENT DISTAL EDGES OF YOUNGER ROCK STRATIGRAPHIC UNITS.
2. REFERENCE: MICKELSON, DAVID M. AND LEE CLAYTON, 1983. LATE PLIESTOCENE HISTORY OF SOUTHEASTERN WISCONSIN - GEOSCIENCE WISCONSIN, VOLUME 7, UNIVERSITY OF WISCONSIN - EXTENSION, P. 65.

ROCK-STRATIGRAPHIC UNITS OF SOUTHEASTERN WISCONSIN	Project Number	13527	B21
MUSKEGO SANITARY LANDFILL WASTE MANAGEMENT OF WISCONSIN, INC. PART OF SECTION 18, T8N, R20E CITY OF MUSKEGO, WAUKESHA CO., WIS.	WARZYN		
Designed By	Drawn By	Checked By	Date
KFB	ALH		1-13
AS SHOWN			
© 1987 Warzyn Engineering Inc. All Rights Reserved			

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EXHIBIT 5

REGIONAL WATER TABLE MAP



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EXHIBIT 6

**U.S. EPA LETTERS REQUIRING PRPs TO A
AMEND GROUNDWATER MONITORING PLAN**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

April 29, 1999

VIA CERTIFIED MAIL

Muskego Site Groundwater Remediation Group
c/o Lisa S. Zebovitz
Neal, Gerber & Eisenberg
Two North LaSalle Street
Chicago, IL 60602

Dear Ms. Zebovitz:

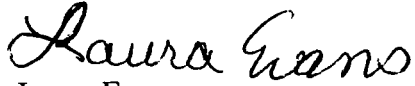
After considering the Muskego Site Groundwater Remediation Group's (MSGRG's) letters dated December 4, 1998 and February 17, 1999 and U.S. EPA's subsequent discussions with the group, the U.S. EPA does not believe that the MSGRG Plan adequately protects human health and the environment. Specifically, the MSGRG proposes extending the municipal water system to only four locations; semi-Annual monitoring of homes not hooked up to municipal water system; extending the municipal water supply to other homes in the immediate area of contamination only if trigger levels are reached; and offering residents not covered by the proposal the option of hooking up at their own expense to municipal system, with the MSGRG offering monetary compensation equal to approximately 5 years of semi-annual monitoring.

This proposal is unacceptable because the U.S. EPA believes that the previously discussed homes of Lawrence Fischer at S8686 Hillendale Drive, Marcell Feinaur at S8916 Hillendale Drive, and Peter and Felicia Luppnow at S8905 Hillendale are in the immediate area of concern and share the same water supply that is now known to have contamination above acceptable and safe levels. These homes must also be hooked up to assure that the action fully protects human health and the environment. In addition, while hooking up all of the necessary homes will reduce the number of monitoring wells needed downgradient of the contaminated area, additional wells are required to have quarterly monitoring. That is, Dr. Edwin Seybold at S8475 Woods Road, Dennis Moody at S8906 Woods Road, Timothy Knutson at S8241 Hillendale Drive, and the Pet Supply Store at W20411 Janesville Road wells shall be monitored quarterly. Furthermore, in order to prevent further delays in hooking up contaminated residential wells to municipal supply, action levels shall be established for immediate hook up to an alternate or municipal supply. If the contaminants of concern are detected, then immediate action shall be taken, prior to levels elevated above what is safe for consumption. Offering temporary alternate water supplies that extend for more than a few months is unacceptable to the U.S. EPA.

The Wisconsin Department of Natural Resources also shares this concern and agrees with the U.S. EPA that these additional three mentioned residential wells must be hooked up to municipal water supply system and quarterly monitoring of surrounding residential wells as part of a response action.

Please let me know by May 14, 1999 whether the MSGRG is ready to negotiate a consent order for performance of this work.

Sincerely,

A handwritten signature in cursive script that reads "Laura Evans".

Laura Evans
Project Manager

cc: James Delwiche, WDNR
Sharon Schaver, WDNR
Nancy Payne, WDNR
Larry Buechele, Project Coordinator for MSGR



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

October 24, 2003

SR-6J

VIA E-MAIL and
CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Lawrence J. Buechel
Project Manager
Waste Management
W124 N9355 Boundary Road
Menominee Falls, WI 53051

Re: Requirement to Amend the Approved Groundwater Monitoring Plan;
Muskego Sanitary Landfill National Priorities List (NPL) Superfund Site
(the Muskego Site), Muskego Wisconsin.

Dear Mr Buechel,

The United States Environmental Protection Agency hereby requires that the Muskego Groundwater Site Remediation Group (MSGRG) amend the existing approved groundwater monitoring plan as is specified below in order to assure that the Work adequately protects human health and the environment. This Work is required pursuant to Sections IX and X of the Unilateral Administrative Order (No. V-W-95-C-29), for the Muskego Sanitary Landfill Groundwater Operable Unit (as required under Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §9621 (c)).

The MSGRG must amend the groundwater monitoring plan to specify that Muskego City Well #7 will be monitored on a quarterly basis for volatile organic compounds (using the approved method -EPA 8260), and the other indicator parameters which are listed in Section 2.2 of the approved plan such as pH, chloride, conductivity, etc. The required changes to the monitoring plan are effective immediately. Within fourteen (14) days of receipt of this letter, MSGRG must submit revised pages to the groundwater monitoring plan in order to document the required changes.

Please contact me at (312) 886-4745, if you have any questions.

Sincerely,
/original signed by Sheri Bianchin/

Sheri L. Bianchin
Remedial Project Manager
Remedial Response Section #6

cc: Mayor Slocumb, City of Muskego
Mr. James C. Delewiche, WDNR
Ms. Sharon Schaver, WDNR
Ms. Nancy Payne, WDNR
Mr. Henry Nehls-Lowe, Health Department
Mr. Thomas Krueger, U.S. EPA
Ms. Susan Pastor, U.S. EPA
Mr. Joseph Janczy, U.S. EPA
Ms. Charlene Denys, U.S. EPA
Mr. Bob Kay, U.S. EPA
Ms. Lisa Zebovitz, MSGRG
Mr. Kenneth J. Quinn, Montgomery Watson

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 7

MUNICIPAL WELL #7 MONITORING INFORMATION

Wisconsin Department of Natural Resources
Drinking Water System
Sample Details

Date: 09/28/2004 01:37:35 PM

Comments

Begin Date

End Date:

PWS IDs:

Extra Sample

Extra Sample A:

Extra Sample B: and head.sample_group_code <> 'BACTI'

Sort Order: order by head.sample_date desc, fn_ws582_order_by_ro(ro.ro_seq_no), head.sample_group_code

Lab Type

Sample Type

Source:

Reason Code

Sample Seq No:

Well No

Sample Id and head.sample_collected_seq_no in
(2134882,1972063,1836328,1862911,1829478,1795514,1710448,1710799,1653072,1568129,1581600,1457078,1450438,1397395,1400009,1324688,1324687,1324686,1324683,1324684)

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: NITRATE

Sample Time: 1015

Sample ID: 10015827

Sample Date: 02/23/2004

Lab ID: 113133790

Reported Date: 03/04/2004

Why Taken: S - SDWA

Sample Type: D - Compliance

Where Taken: E - Entry Point

WUWN: KW594

Collector: T BOURDO

EP/Source: 7

Created: 03/04/2004

By: LDES

Location Addr: W200 S8227 JANESVILLE RD, MUSKEGO

Last Changed: 03/04/2004

By: F/M

Location Desc: SAMPLE TAP

Storet Parameter

Qualifier

Result Units

Storet Parameter

Qualifier

Result Units

630 NITRATE+NITRITE

Non-Detect

0 MG/L

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: NITRATE

Sample Time: 945

Sample ID: IN015750

Sample Date: 03/10/2003

Lab ID: 113133790

Reported Date: 03/13/2003

Why Taken: S - SDWA

Sample Type: D - Compliance

Where Taken: E - Entry Point

WUWN: KW594

Collector: T BOURDO

EP/Source: 7

Created: 03/13/2003

By: LDES

Location Addr: W200 S8227 JANESVILLE RD, MUSKEGO

Last Changed: 03/13/2003

By: F/M

Location Desc: SAMPLE TAP

Storet Parameter

Qualifier

Result Units

Storet Parameter

Qualifier

Result Units

630 NITRATE+NITRITE

Non-Detect

0 MG/L

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: IOC
Sample Date: 03/11/2002
Reported Date: 04/09/2002
Where Taken: E - Entry Point
EP/Source: 7
Location Addr: W200 S8227 JANESVILLE RD, MUSKEGO
Location Desc: SAMPLE TAP

Sample Time: 930
Lab ID: 113133790
Why Taken: S - SDWA
WUWN: KW594

Sample ID: IM017932
Sample Type: D - Compliance
Collector: T BOURDO
Created: 04/09/2002
Last Changed: 04/09/2002

By: LDES
By: F/M

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
1097 ANTIMONY TOTAL	Non-Detect	0	UG/L				
1002 ARSENIC TOTAL	Normal (No prob	5	UG/L				
1007 BARIUM TOTAL	Normal (No prob	98	UG/L				
1012 BERYLLIUM TOTAL	Non-Detect	0	UG/L				
1027 CADMIUM TOTAL	Non-Detect	0	UG/L				
1034 CHROMIUM TOTAL	Non-Detect	0	UG/L				
951 FLUORIDE TOTAL	Normal (No prob	.42	MG/L				
71900 MERCURY TOTAL	Non-Detect	0	UG/L				
1067 NICKEL TOTAL	Non-Detect	0	UG/L				
620 NITRATE AS N	Non-Detect	0	MG/L				
630 NITRATE+NITRITE	Non-Detect	0	MG/L				
615 NITRITE (NO2-N) TOTAL	Non-Detect	0	MG/L				
1147 SELENIUM TOTAL	Non-Detect	0	UG/L				
929 SODIUM TOTAL	Normal (No prob	5.6	MG/L				
1059 THALLIUM TOTAL	Non-Detect	0	UG/L				

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: RAD
Sample Date: 03/11/2002
Reported Date: 05/15/2002
Where Taken: E - Entry Point
EP/Source: 7
Location Addr: JANESVILLE RD
Location Desc: W200 S8227

Sample Time: 915
Lab ID: 113133790
Why Taken: S - SDWA
WUWN: KW594

Sample ID: RL081601
Sample Type: G - Grab
Collector: T BOURDO
Created: 06/07/2002
Last Changed: 06/07/2002

By: LDES
By: F/M

	<u>Storet Parameter</u>
1501	GROSS ALPHA
3501	GROSS BETA
11503	RADIUM 226 + 228 TOTAL
9503	RADIUM-226 DISS
11501	RADIUM-228, TOTAL

<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
Non-Detect	1	PCI/L
Non-Detect	.9	PCI/L
Normal (No prob	1.26	PCI/L
Normal (No prob	.26	PCI/L
Normal (No prob	1	PCI/L

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: VOC
Sample Date: 03/11/2002
Reported Date: 03/21/2002
Where Taken: E - Entry Point
EP/Source: 7
Location Addr: W200 S8227 JANESVILLE RD
Location Desc: SAMPLE TAP

Sample Time: 905
Lab ID: 113133790
Why Taken: S - SDWA
WUWN: KW594

Sample ID: OM002284
Sample Type: D - Compliance
Collector: T BOURDO
Created: 03/21/2002
Last Changed: 03/21/2002

By: LDES
By: F/M

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
77562 1,1,1,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	32102 CARBON TETRACHLORIDE	Non-Detect	0	UG/L
34506 1,1,1-TRICHLOROETHANE	Non-Detect	0	UG/L	34301 CHLOROBENZENE	Non-Detect	0	UG/L
34516 1,1,2,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	34311 CHLOROETHANE	Non-Detect	0	UG/L
34511 1,1,2-TRICHLOROETHANE	Non-Detect	0	UG/L	32106 CHLOROFORM	Non-Detect	0	UG/L
34496 1,1-DICHLOROETHANE	Non-Detect	0	UG/L	34418 CHLOROMETHANE	Non-Detect	0	UG/L
34501 1,1-DICHLOROETHYLENE	Non-Detect	0	UG/L	32105 DIBROMOCHLOROMETHANE	Non-Detect	0	UG/L
77168 1,1-DICHLOROPROPENE	Non-Detect	0	UG/L	38437 DIBROMOCHLOROPROPANE(DBCP)	Non-Detect	0	UG/L
77613 1,2,3-TRICHLOROBENZENE	Non-Detect	0	UG/L	77596 DIBROMOMETHANE	Non-Detect	0	UG/L
77443 1,2,3-TRICHLOROPROPANE	Non-Detect	0	UG/L	34668 DICHLORODIFLUOROMETHANE	Non-Detect	0	UG/L
34551 1,2,4-TRICHLOROBENZENE	Non-Detect	0	UG/L	34423 DICHLOROMETHANE	Non-Detect	0	UG/L
77222 1,2,4-TRIMETHYLBENZENE	Non-Detect	0	UG/L	34371 ETHYL BENZENE	Non-Detect	0	UG/L
34536 1,2-DICHLOROBENZENE (O-)	Non-Detect	0	UG/L	77651 ETHYLENE DIBROMIDE (EDB)	Non-Detect	0	UG/L
34531 1,2-DICHLOROETHANE	Non-Detect	0	UG/L	34391 HEXACHLOROBUTADIENE	Non-Detect	0	UG/L
77093 1,2-DICHLOROETHYLENE CIS	Non-Detect	0	UG/L	77223 ISOPROPYLBENZENE	Non-Detect	0	UG/L
34546 1,2-DICHLOROETHYLENE, TRA	Non-Detect	0	UG/L	77356 ISOPROPYLTOLUENE P	Non-Detect	0	UG/L
34541 1,2-DICHLOROPROPANE	Non-Detect	0	UG/L	78032 METHYL T-BUTYL ETHER	Non-Detect	0	UG/L
77226 1,3,5-TRIMETHYLBENZENE	Non-Detect	0	UG/L	77342 N-BUTYLBENZENE	Non-Detect	0	UG/L
34566 1,3-DICHLOROBENZENE (M-)	Non-Detect	0	UG/L	34696 NAPHTHALENE	Non-Detect	0	UG/L
77173 1,3-DICHLOROPROPANE	Non-Detect	0	UG/L	77275 O-CHLOROTOLUENE	Non-Detect	0	UG/L
34561 1,3-DICHLOROPROPENE	Non-Detect	0	UG/L	77277 P-CHLOROTOLUENE	Non-Detect	0	UG/L
34704 1,3-DICHLOROPROPENE CIS	Non-Detect	0	UG/L	77224 PROPYLBENZENE N	Non-Detect	0	UG/L
34699 1,3-DICHLOROPROPENE TRANS	Non-Detect	0	UG/L	77128 STYRENE	Non-Detect	0	UG/L
34571 1,4-DICHLOROBENZENE (P-)	Non-Detect	0	UG/L	34475 TETRACHLOROETHYLENE	Non-Detect	0	UG/L
77170 2,2-DICHLOROPROPANE	Non-Detect	0	UG/L	34010 TOLUENE	Non-Detect	0	UG/L
34030 BENZENE	Non-Detect	0	UG/L	39180 TRICHLOROETHYLENE	Non-Detect	0	UG/L
81555 BROMOBENZENE	Non-Detect	0	UG/L	34488 TRICHLOROFLUOROMETHANE	Non-Detect	0	UG/L
77297 BROMOCHLOROMETHANE	Non-Detect	0	UG/L	82080 TTHM IN WATER,(SUMMATION)	Non-Detect	0	UG/L
32101 BROMODICHLOROMETHANE	Non-Detect	0	UG/L	39175 VINYL CHLORIDE	Non-Detect	0	UG/L
32104 BROMOFORM	Non-Detect	0	UG/L	85795 XYLENE META & PARA	Non-Detect	0	UG/L
34413 BROMOMETHANE	Non-Detect	0	UG/L	77135 XYLENE O	Non-Detect	0	UG/L
77350 BUTYLBENZENE SEC	Non-Detect	0	UG/L	79724 XYLENE TOTAL	Non-Detect	0	UG/L
77353 BUTYLBENZENE TERT	Non-Detect	0	UG/L				

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: IOC
Sample Date: 10/30/2001
Reported Date: 11/20/2001
Where Taken: W - Well
EP/Source: 7
Location Addr: W200 S8227 JANESVILLE RD, MUSKEGO
Location Desc: SAMPLE TAP

Sample Time: 1445
Lab ID: 113133790
Why Taken: M - Misc
WUWN: KW594

Sample ID: IM011333
Sample Type: W - Raw Water
Collector: T BOURDO
Created: 11/20/2001
Last Changed: 06/21/2002

By: LDES
By: F/M

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
410 ALKALINITY TOTAL CACO3	Normal (No prob)	307	MG/L				
1009 BARIUM TOTAL RECOVERABLE	Normal (No prob)	100	UG/L				
918 CALCIUM TOT REC ICP	Normal (No prob)	75.1	MG/L				
940 CHLORIDE	Normal (No prob)	8.6	MG/L				
95 CONDUCTIVITY AT 25C	Normal (No prob)	672	UMHOS/CM				
951 FLUORIDE TOTAL	Normal (No prob)	.38	MG/L				
899 HARDNESS TOT REC MICRO CALC METHOD	Normal (No prob)	374	MG/L				
980 IRON ICP TOTAL RECOVERABLE	Normal (No prob)	.8	MG/L				
921 MAGNESIUM TOT REC ICP Total Recoverable	Normal (No prob)	45.3	MG/L				
1123 MANGANESE TOTAL RECOVERABLE ICP	Normal (No prob)	39	UG/L				
620 NITRATE AS N	Non-Detect	0	MG/L				
630 NITRATE+NITRITE	Non-Detect	0	MG/L				
615 NITRITE (NO2-N) TOTAL	Non-Detect	0	MG/L				
403 PH LAB	Normal (No prob)	7.97	SU				
134 RESIDUE TOTAL	Normal (No prob)	400	MG/L				
923 SODIUM TOTAL RECOVERABLE	Normal (No prob)	5.6	MG/L				
945 SULFATE TOTAL	Normal (No prob)	49.5	MG/L				

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: VOC

Sample Time: 1200

Sample ID: OL001617

Sample Date: 02/27/2001

Lab ID: 113133790

Reported Date: 03/12/2001

Why Taken: S - SDWA

Sample Type: D - Compliance

Where Taken: E - Entry Point

WUWN: KW594

Collector: G MAYER

EP/Source: 7

Created: 03/12/2001

By: LDES

Location Addr: W200 S8227 JANESVILLE RD WELL #7

Last Changed: 04/03/2001

By: F/M

Location Desc: SAMPLE TAP

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
77562 1,1,1,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	32102 CARBON TETRACHLORIDE	Non-Detect	0	UG/L
34506 1,1,1-TRICHLOROETHANE	Non-Detect	0	UG/L	34301 CHLOROBENZENE	Non-Detect	0	UG/L
34516 1,1,2,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	34311 CHLOROETHANE	Non-Detect	0	UG/L
34511 1,1,2-TRICHLOROETHANE	Non-Detect	0	UG/L	32106 CHLOROFORM	Non-Detect	0	UG/L
34496 1,1-DICHLOROETHANE	Non-Detect	0	UG/L	34418 CHLOROMETHANE	Non-Detect	0	UG/L
34501 1,1-DICHLOROETHYLENE	Non-Detect	0	UG/L	32105 DIBROMOCHLOROMETHANE	Non-Detect	0	UG/L
77168 1,1-DICHLOROPROPENE	Non-Detect	0	UG/L	38437 DIBROMOCHLOROPROPANE(DBCP)	Non-Detect	0	UG/L
77613 1,2,3-TRICHLOROBENZENE	Non-Detect	0	UG/L	77596 DIBROMOMETHANE	Non-Detect	0	UG/L
77443 1,2,3-TRICHLOROPROPANE	Non-Detect	0	UG/L	34668 DICHLORODIFLUOROMETHANE	Non-Detect	0	UG/L
34551 1,2,4-TRICHLOROBENZENE	Non-Detect	0	UG/L	34423 DICHLOROMETHANE	Non-Detect	0	UG/L
77222 1,2,4-TRIMETHYLBENZENE	Non-Detect	0	UG/L	34371 ETHYL BENZENE	Non-Detect	0	UG/L
34536 1,2-DICHLOROBENZENE (O-)	Non-Detect	0	UG/L	77651 ETHYLENE DIBROMIDE (EDB)	Non-Detect	0	UG/L
34531 1,2-DICHLOROETHANE	Non-Detect	0	UG/L	34391 HEXACHLOROBUTADIENE	Non-Detect	0	UG/L
77093 1,2-DICHLOROETHYLENE CIS	Non-Detect	0	UG/L	77223 ISOPROPYLBENZENE	Non-Detect	0	UG/L
34546 1,2-DICHLOROETHYLENE, TRA	Non-Detect	0	UG/L	77356 ISOPROPYLTOLUENE P	Non-Detect	0	UG/L
34541 1,2-DICHLOROPROPANE	Non-Detect	0	UG/L	78032 METHYL T-BUTYL ETHER	Non-Detect	0	UG/L
77226 1,3,5-TRIMETHYLBENZENE	Non-Detect	0	UG/L	77342 N-BUTYLBENZENE	Non-Detect	0	UG/L
34566 1,3-DICHLOROBENZENE (M-)	Non-Detect	0	UG/L	34696 NAPHTHALENE	Non-Detect	0	UG/L
77173 1,3-DICHLOROPROPANE	Non-Detect	0	UG/L	77275 O-CHLOROTOLUENE	Non-Detect	0	UG/L
34561 1,3-DICHLOROPROPENE	Non-Detect	0	UG/L	77277 P-CHLOROTOLUENE	Non-Detect	0	UG/L
34704 1,3-DICHLOROPROPENE CIS	Non-Detect	0	UG/L	77224 PROPYLBENZENE N	Non-Detect	0	UG/L
34699 1,3-DICHLOROPROPENE TRANS	Non-Detect	0	UG/L	77128 STYRENE	Non-Detect	0	UG/L
34571 1,4-DICHLOROBENZENE (P-)	Non-Detect	0	UG/L	34475 TETRACHLOROETHYLENE	Non-Detect	0	UG/L
77170 2,2-DICHLOROPROPANE	Non-Detect	0	UG/L	34010 TOLUENE	Non-Detect	0	UG/L
34030 BENZENE	Non-Detect	0	UG/L	39180 TRICHLOROETHYLENE	Non-Detect	0	UG/L
81555 BROMOBENZENE	Non-Detect	0	UG/L	34488 TRICHLOROFLUOROMETHANE	Non-Detect	0	UG/L
77297 BROMOCHLOROMETHANE	Non-Detect	0	UG/L	82080 TTHM IN WATER,(SUMMATION)	Non-Detect	0	UG/L
32101 BROMODICHLOROMETHANE	Non-Detect	0	UG/L	39175 VINYL CHLORIDE	Non-Detect	0	UG/L
32104 BROMOFORM	Non-Detect	0	UG/L	85795 XYLENE META & PARA	Non-Detect	0	UG/L
34413 BROMOMETHANE	Non-Detect	0	UG/L	77135 XYLENE O	Non-Detect	0	UG/L
77350 BUTYLBENZENE SEC	Non-Detect	0	UG/L	79724 XYLENE TOTAL	Non-Detect	0	UG/L
77353 BUTYLBENZENE TERT	Non-Detect	0	UG/L				

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: NITRATE

Sample Time: 1115

Sample ID: IL017097

Sample Date: 02/26/2001

Lab ID: 113133790

Reported Date: 03/13/2001

Why Taken: S - SDWA

Sample Type: D - Compliance

Where Taken: E - Entry Point

WUWN: KW594

Collector: G MAYER

EP/Source: 7

Created: 03/13/2001

By: LDES

Location Addr: MUSKEGO WATER UTILITY - W200 S8227 JANESVILLE RD, MUSKEG

Last Changed: 03/13/2001

By: F/M

Location Desc: SAMPLE TAP

Storet Parameter

Qualifier

Result Units

Storet Parameter

Qualifier

Result Units

630 NITRATE+NITRITE

Non-Detect

0 MG/L

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: ARSENIC

Sample Time: 1355

Sample ID: IL007727

Sample Date: 09/20/2000

Lab ID: 113133790

Reported Date: 10/11/2000

Why Taken: M - Misc

Sample Type: W - Raw Water

Where Taken: W - Well

WUWN: KW594

Collector: G MAYER

EP/Source: 7

Created: 10/16/2000

By: SLOH

Location Addr: MUSKEGO WATER UTILITY W200 S8227 JANESVILLE RD MUSKEGO

Last Changed: 10/17/2000

By: F/M

Location Desc: WELL #7 SAMPLE TAP

Storet Parameter

Qualifier

Result Units

Storet Parameter

Qualifier

Result Units

1002 ARSENIC TOTAL

Normal (No prob

4.1 UG/L

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: NITRATE

Sample Time: 1215

Sample ID: IK018568

Sample Date: 02/22/2000

Lab ID: 113133790

Reported Date: 03/02/2000

Why Taken: S - SDWA

Sample Type: D - Compliance

Where Taken: E - Entry Point

WUWN: KW594

Collector: G MAYER

EP/Source: 7

Created: 03/06/2000

By: SLOH

Location Addr: MUSKEGO WATER UTILITY MUSKEGO WI 53150

Last Changed: 03/06/2000

By: F/M

Location Desc:

Storet Parameter

Qualifier

Result Units

Storet Parameter

Qualifier

Result Units

630 NITRATE+NITRITE

Between LOD & .1 MG/L

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: VOC

Sample Time: 1220

Sample ID: OK002461

Sample Date: 02/22/2000

Lab ID: 113133790

Reported Date: 03/07/2000

Why Taken: S - SDWA

Sample Type: D - Compliance

Where Taken: E - Entry Point

WUWN: KW594

Collector: G MAYER

EP/Source: 7

Created: 04/13/2000

By: SLOH

Location Addr: WELL #7 W200 S8227 JANESVILLE RD

Last Changed: 04/19/2000

By: F/M

Location Desc: SAMPLE TAP

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
77562 1,1,1,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	32102 CARBON TETRACHLORIDE	Non-Detect	0	UG/L
34506 1,1,1-TRICHLOROETHANE	Non-Detect	0	UG/L	34301 CHLOROBENZENE	Non-Detect	0	UG/L
34516 1,1,2,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	34311 CHLOROETHANE	Non-Detect	0	UG/L
34511 1,1,2-TRICHLOROETHANE	Non-Detect	0	UG/L	32106 CHLOROFORM	Non-Detect	0	UG/L
34496 1,1-DICHLOROETHANE	Non-Detect	0	UG/L	34418 CHLOROMETHANE	Non-Detect	0	UG/L
34501 1,1-DICHLOROETHYLENE	Non-Detect	0	UG/L	32105 DIBROMOCHLOROMETHANE	Non-Detect	0	UG/L
77168 1,1-DICHLOROPROPENE	Non-Detect	0	UG/L	38437 DIBROMOCHLOROPROPANE(DBCP)	Non-Detect	0	UG/L
77613 1,2,3-TRICHLOROBENZENE	Non-Detect	0	UG/L	77596 DIBROMOMETHANE	Non-Detect	0	UG/L
77443 1,2,3-TRICHLOROPROPANE	Non-Detect	0	UG/L	34668 DICHLORODIFLUOROMETHANE	Non-Detect	0	UG/L
34551 1,2,4-TRICHLOROBENZENE	Non-Detect	0	UG/L	34423 DICHLOROMETHANE	Non-Detect	0	UG/L
77222 1,2,4-TRIMETHYLBENZENE	Non-Detect	0	UG/L	34371 ETHYL BENZENE	Non-Detect	0	UG/L
34536 1,2-DICHLOROBENZENE (O-)	Non-Detect	0	UG/L	77651 ETHYLENE DIBROMIDE (EDB)	Non-Detect	0	UG/L
34531 1,2-DICHLOROETHANE	Non-Detect	0	UG/L	34391 HEXACHLOROBUTADIENE	Non-Detect	0	UG/L
77093 1,2-DICHLOROETHYLENE CIS	Non-Detect	0	UG/L	77223 ISOPROPYLBENZENE	Non-Detect	0	UG/L
34546 1,2-DICHLOROETHYLENE, TRA	Non-Detect	0	UG/L	77356 ISOPROPYLTOLUENE P	Non-Detect	0	UG/L
34541 1,2-DICHLOROPROPANE	Non-Detect	0	UG/L	78032 METHYL T-BUTYL ETHER	Non-Detect	0	UG/L
77226 1,3,5-TRIMETHYLBENZENE	Non-Detect	0	UG/L	77342 N-BUTYLBENZENE	Non-Detect	0	UG/L
34566 1,3-DICHLOROBENZENE (M-)	Non-Detect	0	UG/L	34696 NAPHTHALENE	Non-Detect	0	UG/L
77173 1,3-DICHLOROPROPANE	Non-Detect	0	UG/L	77275 O-CHLOROTOLUENE	Non-Detect	0	UG/L
34561 1,3-DICHLOROPROPENE	Non-Detect	0	UG/L	77277 P-CHLOROTOLUENE	Non-Detect	0	UG/L
34704 1,3-DICHLOROPROPENE CIS	Non-Detect	0	UG/L	77224 PROPYLBENZENE N	Non-Detect	0	UG/L
34699 1,3-DICHLOROPROPENE TRANS	Non-Detect	0	UG/L	77128 STYRENE	Non-Detect	0	UG/L
34571 1,4-DICHLOROBENZENE (P-)	Non-Detect	0	UG/L	34475 TETRACHLOROETHYLENE	Non-Detect	0	UG/L
77170 2,2-DICHLOROPROPANE	Non-Detect	0	UG/L	34010 TOLUENE	Non-Detect	0	UG/L
34030 BENZENE	Non-Detect	0	UG/L	39180 TRICHLOROETHYLENE	Non-Detect	0	UG/L
81555 BROMOBENZENE	Non-Detect	0	UG/L	34488 TRICHLOROFLUOROMETHANE	Non-Detect	0	UG/L
77297 BROMOCHLOROMETHANE	Non-Detect	0	UG/L	82080 TTHM IN WATER,(SUMMATION)	Non-Detect	0	UG/L
32101 BROMODICHLOROMETHANE	Non-Detect	0	UG/L	39175 VINYL CHLORIDE	Non-Detect	0	UG/L
32104 BROMOFORM	Non-Detect	0	UG/L	85795 XYLENE META & PARA	Non-Detect	0	UG/L
34413 BROMOMETHANE	Non-Detect	0	UG/L	77135 XYLENE O	Non-Detect	0	UG/L
77350 BUTYLBENZENE SEC	Non-Detect	0	UG/L	79724 XYLENE TOTAL	Non-Detect	0	UG/L
77353 BUTYLBENZENE TERT	Non-Detect	0	UG/L				

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: IOC

Sample Time: 1005

Sample ID: IJ017299

Sample Date: 03/08/1999

Lab ID: 113133790

Reported Date: 04/21/1999

Why Taken: S - SDWA

Where Taken: E - Entry Point

WUWN: KW594

EP/Source: 7

Sample Type: D - Compliance

Collector: G MAYER

Location Addr: MUSKEGO WATER UTILITY W200 S8227 JANESVILLE RD MUSKEGO

Created: 04/26/1999

By: SLOH

Location Desc: WELL #7 - SAMPLE TAP

Last Changed: 04/27/1999

By: F/M

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
410 ALKALINITY TOTAL CACO3	Normal (No prob	314	MG/L				
1105 ALUMINUM TOTAL	Between LOD &	52	UG/L				
1097 ANTIMONY TOTAL	Non-Detect	0	UG/L				
1002 ARSENIC TOTAL	Normal (No prob	4.6	UG/L				
1007 BARIUM TOTAL	Normal (No prob	97	UG/L				
1012 BERYLLIUM TOTAL	Non-Detect	0	UG/L				
1027 CADMIUM TOTAL	Non-Detect	0	UG/L				
916 CALCIUM TOTAL	Normal (No prob	64	MG/L				
940 CHLORIDE	Normal (No prob	6.7	MG/L				
1034 CHROMIUM TOTAL	Non-Detect	0	UG/L				
95 CONDUCTIVITY AT 25C	Normal (No prob	622	UMHOS/CM				
951 FLUORIDE TOTAL	Normal (No prob	.53	MG/L				
900 HARDNESS TOTAL CACO3	Normal (No prob	330	MG/L				
1045 IRON ICP	Normal (No prob	.6	MG/L				
927 MAGNESIUM TOTAL	Normal (No prob	41	MG/L				
1055 MANGANESE	Normal (No prob	38	UG/L				
71900 MERCURY TOTAL	Non-Detect	0	UG/L				
1067 NICKEL TOTAL	Between LOD &	10	UG/L				
620 NITRATE AS N	Between LOD &	.12	MG/L				
630 NITRATE+NITRITE	Between LOD &	.12	MG/L				
615 NITRITE (NO2-N) TOTAL	Non-Detect	0	MG/L				
403 PH LAB	Normal (No prob	7.78	SU				
1147 SELENIUM TOTAL	Non-Detect	0	UG/L				
1079 SILVER, ICP-MS, 11 TOT REC	Non-Detect	0	UG/L				
929 SODIUM TOTAL	Normal (No prob	5.9	MG/L				
500 SOLIDS, TOTAL	Normal (No prob	402	MG/L				
1059 THALLIUM TOTAL	Non-Detect	0	UG/L				
1092 ZINC TOTAL	Non-Detect	0	UG/L				

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: VOC

Sample Time: 1015

Sample ID: OJ002067

Sample Date: 03/08/1999

Lab ID: 113133790

Reported Date: 03/22/1999

Why Taken: S - SDWA

Where Taken: E - Entry Point

WUWN: KW594

EP/Source: 7

Sample Type: D - Compliance

Collector: G MAYER

Created: 03/29/1999

By: SLOH

Location Addr: W200 S8227 JANESVILLE RD (WELL #7)

Last Changed: 03/29/1999

By: F/M

Location Desc: SAMPLE TAP

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
77562 1,1,1,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	32102 CARBON TETRACHLORIDE	Non-Detect	0	UG/L
34506 1,1,1-TRICHLOROETHANE	Non-Detect	0	UG/L	34301 CHLOROBENZENE	Non-Detect	0	UG/L
34516 1,1,2,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	34311 CHLOROETHANE	Non-Detect	0	UG/L
34511 1,1,2-TRICHLOROETHANE	Non-Detect	0	UG/L	32106 CHLOROFORM	Non-Detect	0	UG/L
34496 1,1-DICHLOROETHANE	Non-Detect	0	UG/L	34418 CHLOROMETHANE	Non-Detect	0	UG/L
34501 1,1-DICHLOROETHYLENE	Non-Detect	0	UG/L	32105 DIBROMOCHLOROMETHANE	Non-Detect	0	UG/L
77168 1,1-DICHLOROPROPENE	Non-Detect	0	UG/L	38437 DIBROMOCHLOROPROPANE(DBCP)	Non-Detect	0	UG/L
77613 1,2,3-TRICHLOROBENZENE	Non-Detect	0	UG/L	77596 DIBROMOMETHANE	Non-Detect	0	UG/L
77443 1,2,3-TRICHLOROPROPANE	Non-Detect	0	UG/L	34668 DICHLORODIFLUOROMETHANE	Non-Detect	0	UG/L
34551 1,2,4-TRICHLOROBENZENE	Non-Detect	0	UG/L	34423 DICHLOROMETHANE	Non-Detect	0	UG/L
77222 1,2,4-TRIMETHYLBENZENE	Non-Detect	0	UG/L	34371 ETHYL BENZENE	Non-Detect	0	UG/L
34536 1,2-DICHLOROBENZENE (O-)	Non-Detect	0	UG/L	77651 ETHYLENE DIBROMIDE (EDB)	Non-Detect	0	UG/L
34531 1,2-DICHLOROETHANE	Non-Detect	0	UG/L	34391 HEXACHLOROBUTADIENE	Non-Detect	0	UG/L
77093 1,2-DICHLOROETHYLENE CIS	Non-Detect	0	UG/L	77223 ISOPROPYLBENZENE	Non-Detect	0	UG/L
34546 1,2-DICHLOROETHYLENE, TRA	Non-Detect	0	UG/L	77356 ISOPROPYLTOLUENE P	Non-Detect	0	UG/L
34541 1,2-DICHLOROPROPANE	Non-Detect	0	UG/L	77342 N-BUTYLBENZENE	Non-Detect	0	UG/L
77226 1,3,5-TRIMETHYLBENZENE	Non-Detect	0	UG/L	34696 NAPHTHALENE	Non-Detect	0	UG/L
34566 1,3-DICHLOROBENZENE (M-)	Non-Detect	0	UG/L	77275 O-CHLOROTOLUENE	Non-Detect	0	UG/L
77173 1,3-DICHLOROPROPANE	Non-Detect	0	UG/L	77277 P-CHLOROTOLUENE	Non-Detect	0	UG/L
34561 1,3-DICHLOROPROPENE	Non-Detect	0	UG/L	77224 PROPYLBENZENE N	Non-Detect	0	UG/L
34704 1,3-DICHLOROPROPENE CIS	Non-Detect	0	UG/L	77128 STYRENE	Non-Detect	0	UG/L
34699 1,3-DICHLOROPROPENE TRANS	Non-Detect	0	UG/L	34475 TETRACHLOROETHYLENE	Non-Detect	0	UG/L
34571 1,4-DICHLOROBENZENE (P-)	Non-Detect	0	UG/L	34010 TOLUENE	Non-Detect	0	UG/L
77170 2,2-DICHLOROPROPANE	Non-Detect	0	UG/L	39180 TRICHLOROETHYLENE	Non-Detect	0	UG/L
34030 BENZENE	Non-Detect	0	UG/L	34488 TRICHLOROFLUOROMETHANE	Non-Detect	0	UG/L
81555 BROMOBENZENE	Non-Detect	0	UG/L	82080 TTHM IN WATER,(SUMMATION)	Non-Detect	0	UG/L
77297 BROMOCHLOROMETHANE	Non-Detect	0	UG/L	39175 VINYL CHLORIDE	Non-Detect	0	UG/L
32101 BROMODICHLOROMETHANE	Non-Detect	0	UG/L	85795 XYLENE META & PARA	Non-Detect	0	UG/L
32104 BROMOFORM	Non-Detect	0	UG/L	77135 XYLENE O	Non-Detect	0	UG/L
34413 BROMOMETHANE	Non-Detect	0	UG/L	79724 XYLENE TOTAL	Non-Detect	0	UG/L
77350 BUTYLBENZENE SEC	Non-Detect	0	UG/L				
77353 BUTYLBENZENE TERT	Non-Detect	0	UG/L				

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: VOC
Sample Date: 08/24/1998
Reported Date: 08/28/1998
Where Taken: E - Entry Point
EP/Source: 7
Location Addr: W200 S8227 JANESVILLE RD
Location Desc: SAMPLE TAP

Sample Time: 1330
Lab ID: 113133790
Why Taken: S - SDWA
WUWN: KW594

Sample ID: OJ000645
Sample Type: D - Compliance
Collector: G MAYER
Created: 08/31/1998
Last Changed: 08/31/1998

By: W13582
By: W13582

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
77562 1,1,1,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	32102 CARBON TETRACHLORIDE	Non-Detect	0	UG/L
34506 1,1,1-TRICHLOROETHANE	Non-Detect	0	UG/L	34301 CHLOROBENZENE	Non-Detect	0	UG/L
34516 1,1,2,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	34311 CHLOROETHANE	Non-Detect	0	UG/L
34511 1,1,2-TRICHLOROETHANE	Non-Detect	0	UG/L	32106 CHLOROFORM	Non-Detect	0	UG/L
34496 1,1-DICHLOROETHANE	Non-Detect	0	UG/L	34418 CHLOROMETHANE	Non-Detect	0	UG/L
34501 1,1-DICHLOROETHYLENE	Non-Detect	0	UG/L	32105 DIBROMOCHLOROMETHANE	Non-Detect	0	UG/L
77168 1,1-DICHLOROPROPENE	Non-Detect	0	UG/L	38437 DIBROMOCHLOROPROPANE(DBCP)	Non-Detect	0	UG/L
77613 1,2,3-TRICHLOROBENZENE	Non-Detect	0	UG/L	77596 DIBROMOMETHANE	Non-Detect	0	UG/L
77443 1,2,3-TRICHLOROPROPANE	Non-Detect	0	UG/L	34668 DICHLORODIFLUOROMETHANE	Non-Detect	0	UG/L
34551 1,2,4-TRICHLOROBENZENE	Non-Detect	0	UG/L	34423 DICHLOROMETHANE	Non-Detect	0	UG/L
77222 1,2,4-TRIMETHYLBENZENE	Non-Detect	0	UG/L	34371 ETHYL BENZENE	Non-Detect	0	UG/L
34536 1,2-DICHLOROBENZENE (O-)	Non-Detect	0	UG/L	77651 ETHYLENE DIBROMIDE (EDB)	Non-Detect	0	UG/L
34531 1,2-DICHLOROETHANE	Non-Detect	0	UG/L	34391 HEXACHLOROBUTADIENE	Non-Detect	0	UG/L
77093 1,2-DICHLOROETHYLENE CIS	Non-Detect	0	UG/L	77223 ISOPROPYLBENZENE	Non-Detect	0	UG/L
34546 1,2-DICHLOROETHYLENE, TRA	Non-Detect	0	UG/L	77356 ISOPROPYLTOLUENE P	Non-Detect	0	UG/L
34541 1,2-DICHLOROPROPANE	Non-Detect	0	UG/L	77342 N-BUTYLBENZENE	Non-Detect	0	UG/L
77226 1,3,5-TRIMETHYLBENZENE	Non-Detect	0	UG/L	34696 NAPHTHALENE	Non-Detect	0	UG/L
34566 1,3-DICHLOROBENZENE (M-)	Non-Detect	0	UG/L	77275 O-CHLOROTOLUENE	Non-Detect	0	UG/L
77173 1,3-DICHLOROPROPANE	Non-Detect	0	UG/L	77277 P-CHLOROTOLUENE	Non-Detect	0	UG/L
34561 1,3-DICHLOROPROPENE	Non-Detect	0	UG/L	77224 PROPYLBENZENE N	Non-Detect	0	UG/L
34704 1,3-DICHLOROPROPENE CIS	Non-Detect	0	UG/L	77128 STYRENE	Non-Detect	0	UG/L
34699 1,3-DICHLOROPROPENE TRANS	Non-Detect	0	UG/L	34475 TETRACHLOROETHYLENE	Non-Detect	0	UG/L
34571 1,4-DICHLOROBENZENE (P-)	Non-Detect	0	UG/L	34010 TOLUENE	Non-Detect	0	UG/L
77170 2,2-DICHLOROPROPANE	Non-Detect	0	UG/L	39180 TRICHLOROETHYLENE	Non-Detect	0	UG/L
34030 BENZENE	Non-Detect	0	UG/L	34488 TRICHLOROFLUOROMETHANE	Non-Detect	0	UG/L
81555 BROMOBENZENE	Non-Detect	0	UG/L	82080 TTHM IN WATER,(SUMMATION)	Non-Detect	0	UG/L
77297 BROMOCHLOROMETHANE	Non-Detect	0	UG/L	39175 VINYL CHLORIDE	Non-Detect	0	UG/L
32101 BROMODICHLOROMETHANE	Non-Detect	0	UG/L	85795 XYLENE META & PARA	Non-Detect	0	UG/L
32104 BROMOFORM	Non-Detect	0	UG/L	77135 XYLENE O	Non-Detect	0	UG/L
34413 BROMOMETHANE	Non-Detect	0	UG/L	79724 XYLENE TOTAL	Non-Detect	0	UG/L
77350 BUTYLBENZENE SEC	Non-Detect	0	UG/L				
77353 BUTYLBENZENE TERT	Non-Detect	0	UG/L				

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: IOC
Sample Date: 08/12/1998
Reported Date: 09/03/1998
Where Taken: E - Entry Point
EP/Source: 7

Sample Time: 1300
Lab ID: 113133790
Why Taken: S - SDWA
WUWN: KW594

Sample ID: IJ004586

Sample Type: D - Compliance
Collector: G MAYER
Created: 09/10/1998
Last Changed: 09/10/1998

By: W13582
By: W13582

Location Addr: MUSKEGO WATER UTILITY W200 S8227 JANESVILLE RD MUSKEGO
Location Desc: WELL #7 SAMPLE TAP

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
630	NITRATE+NITRITE	Non-Detect	0				
929	SODIUM TOTAL	Normal (No prob	6.3				
			MG/L				

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: IOC
Sample Date: 07/09/1997
Reported Date: 11/05/1997
Where Taken: W - Well
EP/Source: 7

Sample Time: 1000
Lab ID: 999766900
Why Taken: M - Misc
WUWN: KW594

Sample ID: 271526

Sample Type: W - Raw Water
Collector: SO
Created: 11/06/1997
Last Changed: 11/06/1997

By: OPSS\$HISELP
By: W13582

Location Addr: MUSKEGO PARK
Location Desc: WELL #7 WELL HEAD DISCHARGE SAMPLE TAP

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
34225 ASBESTOS	Non-Detect	0	FIB/L				

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: IOC
Sample Date: 06/25/1997
Reported Date: 11/05/1997
Where Taken: E - Entry Point
EP/Source: 7

Sample Time: 1100
Lab ID: 999766900
Why Taken: S - SDWA
WUWN: KW594

Sample ID: 265201

Sample Type: D - Compliance
Collector: SO
Created: 11/06/1997
Last Changed: 07/08/1998

By: OPSS\$HISELP
By: OPSS\$ZELLMJ

Location Addr: MUSKEGO PARK

Location Desc: WELL #7 WELL HEAD DICHARGE SAMPLE TAP

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
410	ALKALINITY TOTAL CACO3	Normal (No prob	310 MG/L				
1097	ANTIMONY TOTAL	Non-Detect	0 MG/L				
1002	ARSENIC TOTAL	Normal (No prob	.011 MG/L				
1007	BARIUM TOTAL	Normal (No prob	.11 MG/L				
1012	BERYLLIUM TOTAL	Non-Detect	0 MG/L				
1025	CADMIUM DISS	Non-Detect	0 MG/L				
916	CALCIUM TOTAL	Normal (No prob	58 MG/L				
940	CHLORIDE	Normal (No prob	4.2 MG/L				
1034	CHROMIUM TOTAL	Normal (No prob	.006 MG/L				
1042	COPPER TOTAL	Normal (No prob	.0026 UG/L				
720	CYANIDE	Non-Detect	0 MG/L				
951	FLUORIDE TOTAL	Normal (No prob	.6 MG/L				
900	HARDNESS TOTAL CACO3	Normal (No prob	320 MG/L				
74010	IRON	Normal (No prob	.25 MG/L				
1051	LEAD TOTAL	Normal (No prob	.0026 UG/L				
927	MAGNESIUM TOTAL	Normal (No prob	43 MG/L				
1055	MANGANESE	Normal (No prob	.054 MG/L				
71900	MERCURY TOTAL	Non-Detect	0 MG/L				
1067	NICKEL TOTAL	Normal (No prob	.0083 MG/L				
618	NITRATE	Non-Detect	0 MG/L				
630	NITRATE+NITRITE	Non-Detect	0 MG/L				
613	NITRITE	Non-Detect	0 MG/L				
403	PH LAB	Normal (No prob	7.5 SU				
1147	SELENIUM TOTAL	Non-Detect	0 MG/L				
1077	SILVER TOTAL	Non-Detect	0 MG/L				
929	SODIUM TOTAL	Normal (No prob	9.3 MG/L				
500	SOLIDS, TOTAL	Normal (No prob	340 MG/L				
945	SULFATE TOTAL	Normal (No prob	24 MG/L				
1059	THALLIUM TOTAL	Non-Detect	0 MG/L				

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: RAD

Sample Time: 1100

Sample ID: 28277

Sample Date: 06/25/1997

Lab ID: 113133790

Reported Date: 11/05/1997

Why Taken: M - Misc

Sample Type: W - Raw Water

Where Taken: W - Well

WUWN: KW594

Collector:

EP/Source: 7

Created: 11/06/1997

By: OPSSHISELP

Location Addr: MUSKEGO PARK

Last Changed: 11/06/1997

By: W13582

Location Desc: WELL #7 DISCHARGE SAMPLE TAP

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
1501 GROSS ALPHA	Normal (No prob	1.9	PCI/L				
3501 GROSS BETA	Normal (No prob	1.8	PCI/L				
82303 RADON-222,TOTAL IN WATER	Normal (No prob	100	PCI/L				

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: SOC

Sample Time: 1100

Sample ID: 265203

Sample Date: 06/25/1997

Lab ID: 999766900

Reported Date: 11/05/1997

Why Taken: S - SDWA

Where Taken: E - Entry Point

WUWN: KW594

EP/Source: 7

Sample Type: D - Compliance

Collector: SO

Created: 11/06/1997

By: OPSSHISELP

Location Addr: MUSKEGO PARK

Last Changed: 11/06/1997

By: W13582

Location Desc: WELL #7 WELL HEAD DISCHARGE SAMPLE TAP

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
38760 1,2-DIBROMO-3-CHLOROPROPA	Non-Detect	0	UG/L	34386 HEXACHLOROCYCLOPENTADIENE	Non-Detect	0	UG/L
39760 2,4,5-TP (SILVEX)	Non-Detect	0	UG/L	39051 METHOMYL	Non-Detect	0	UG/L
39730 2,4-D	Non-Detect	0	UG/L	39480 METHOXYCHLOR	Non-Detect	0	UG/L
82584 3-HYDROXYCARBOFURAN	Non-Detect	0	UG/L	39356 METOLACHLOR (DUAL)	Non-Detect	0	UG/L
46317 ALACHLOR (LASSO)	Non-Detect	0	UG/L	81408 METRIBUZIN (SENCOR)	Non-Detect	0	UG/L
39053 ALDICARB (TEMIK)	Non-Detect	0	UG/L	38865 OXAMYL (VYDATE)	Non-Detect	0	UG/L
82587 ALDICARB SULFONE	Non-Detect	0	UG/L	39515 PCB TOTAL	Non-Detect	0	UG/L
82586 ALDICARB SULFOXIDE	Non-Detect	0	UG/L	39032 PENTACHLOROPHENOL	Non-Detect	0	UG/L
34680 ALDRIN	Non-Detect	0	UG/L	39720 PICLORAM (TORDON)	Non-Detect	0	UG/L
39033 ATRAZINE	Non-Detect	0	UG/L	30295 PROPACHLOR	Non-Detect	0	UG/L
34247 BENZO (A) PYRENE	Non-Detect	0	UG/L	39055 SIMAZINE	Non-Detect	0	UG/L
39340 BHC GAMMA (LINDANE)	Non-Detect	0	UG/L	39400 TOXAPHENE	Non-Detect	0	UG/L
77860 BUTACHLOR	Non-Detect	0	UG/L				
77700 CARBARYL	Non-Detect	0	UG/L				
81405 CARBOFURAN	Non-Detect	0	UG/L				
39350 CHLORDANE	Non-Detect	0	UG/L				
39348 CHLORDANE ALPHA	Non-Detect	0	UG/L				
39810 CHLORDANE GAMMA	Non-Detect	0	UG/L				
38432 DALAPON	Non-Detect	0	UG/L				
77903 DI(2-ETHYLHEXYL)ADIPATE	Non-Detect	0	UG/L				
46312 DI(2-ETHYLHEXYL)PHTHALATE	Non-Detect	0	UG/L				
82052 DICAMBA	Non-Detect	0	UG/L				
39380 DIELDRIN	Non-Detect	0	UG/L				
81287 DINOSEB	Non-Detect	0	UG/L				
78885 DIQUAT	Non-Detect	0	UG/L				
38926 ENDOTHALL	Non-Detect	0	UG/L				
39390 ENDRIN	Non-Detect	0	UG/L				
46369 ETHYLENE DIBROMIDE (EDB)	Non-Detect	0	UG/L				
39941 GLYPHOSATE (ROUND-UP)	Non-Detect	0	UG/L				
39410 HEPTACHLOR	Non-Detect	0	UG/L				
39420 HEPTACHLOR EPOXIDE	Non-Detect	0	UG/L				
34688 HEXACHLOROBENZENE	Non-Detect	0	UG/L				

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Wisconsin Department of Natural Resources
Drinking Water System

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Samples between and

PWS ID: 26817417

PWS Name: MUSKEGO WATER UTILITY

Sample Group: VOC

Sample Time: 1100

Sample ID: 265207

Sample Date: 06/25/1997

Lab ID: 999766900

Reported Date: 11/05/1997

Why Taken: S - SDWA

Where Taken: E - Entry Point

WUWN: KW594

EP/Source: 7

Location Addr: MUSKEGO PARK

Sample Type: D - Compliance

Collector: SO

Created: 11/06/1997

By: OPSSHISELP

Location Desc: WELL #7 WELL HEAD DISCHARGE SAMPLE TAP

Last Changed: 11/06/1997

By: W13582

<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>	<u>Storet Parameter</u>	<u>Qualifier</u>	<u>Result</u>	<u>Units</u>
77562 1,1,1,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	34371 ETHYL BENZENE	Non-Detect	0	UG/L
34506 1,1,1-TRICHLOROETHANE	Non-Detect	0	UG/L	77275 O-CHLOROTOLUENE	Non-Detect	0	UG/L
34516 1,1,2,2 TETRACHLOROETHANE	Non-Detect	0	UG/L	77277 P-CHLOROTOLUENE	Non-Detect	0	UG/L
34511 1,1,2-TRICHLOROETHANE	Non-Detect	0	UG/L	77128 STYRENE	Non-Detect	0	UG/L
34496 1,1-DICHLOROETHANE	Non-Detect	0	UG/L	34475 TETRACHLOROETHYLENE	Non-Detect	0	UG/L
34501 1,1-DICHLOROETHYLENE	Non-Detect	0	UG/L	34010 TOLUENE	Non-Detect	0	UG/L
77168 1,1-DICHLOROPROPENE	Non-Detect	0	UG/L	39180 TRICHLOROETHYLENE	Non-Detect	0	UG/L
77443 1,2,3-TRICHLOROPROPANE	Non-Detect	0	UG/L	82080 TTHM IN WATER,(SUMMATION)	Non-Detect	0	UG/L
34551 1,2,4-TRICHLOROBENZENE	Non-Detect	0	UG/L	39175 VINYL CHLORIDE	Non-Detect	0	UG/L
34536 1,2-DICHLOROBENZENE (O-)	Non-Detect	0	UG/L	79724 XYLENE TOTAL	Non-Detect	0	UG/L
34531 1,2-DICHLOROETHANE	Non-Detect	0	UG/L				
77093 1,2-DICHLOROETHYLENE CIS	Non-Detect	0	UG/L				
34546 1,2-DICHLOROETHYLENE, TRA	Non-Detect	0	UG/L				
34541 1,2-DICHLOROPROPANE	Non-Detect	0	UG/L				
34566 1,3-DICHLOROBENZENE (M-)	Non-Detect	0	UG/L				
77173 1,3-DICHLOROPROPANE	Non-Detect	0	UG/L				
34561 1,3-DICHLOROPROPENE	Non-Detect	0	UG/L				
34571 1,4-DICHLOROBENZENE (P-)	Non-Detect	0	UG/L				
77170 2,2-DICHLOROPROPANE	Non-Detect	0	UG/L				
34030 BENZENE	Non-Detect	0	UG/L				
81555 BROMOBENZENE	Non-Detect	0	UG/L				
32101 BROMODICHLOROMETHANE	Non-Detect	0	UG/L				
32104 BROMOFORM	Non-Detect	0	UG/L				
34413 BROMOMETHANE	Non-Detect	0	UG/L				
32102 CARBON TETRACHLORIDE	Non-Detect	0	UG/L				
34301 CHLOROBENZENE	Non-Detect	0	UG/L				
34311 CHLOROETHANE	Non-Detect	0	UG/L				
32106 CHLOROFORM	Non-Detect	0	UG/L				
34418 CHLOROMETHANE	Non-Detect	0	UG/L				
32105 DIBROMOCHLOROMETHANE	Non-Detect	0	UG/L				
77596 DIBROMOMETHANE	Non-Detect	0	UG/L				
34423 DICHLOROMETHANE	Non-Detect	0	UG/L				

Wisconsin Department of Natural Resources
Drinking Water System
Monitoring Requirements
Monitoring Schedule for Public Systems

Date: 10/24/2003 11:58:27 AM

Comments

Start Date: 01/01/2002

End Date: 12/31/2002

County:

Region:

PWS Type:

DS Status:

PWS IDs: and inv.pws_id in (26817417)

Service Type:

Extra PWS:

Extra PWS A

Extra PWS B:

Monitor Group

Sort Order:

Attachment 1
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Wisconsin Department of Natural Resources
Drinking Water System
Monitoring Requirements
Monitoring Schedule for Public Systems
Period: 01/01/2002 to 12/31/2002

Page 2 of 5

System Type: MC - Municipal Community
Region: Southeast Region (2)
County: Waukesha (68)

MUSKEGO WATER UTILITY
26817417 City: MUSKEGO
Pop: 8000

Sampler Information:

Public Utilities Supt Scott Kloskowski
W189 SR235 Mercury Dr P O Box 903
Muskego, WI 53150
(262) 679-4128

Owner Information:

Muskego City Clerk
W182 58200 RACINE AVE
Muskego, WI 53150
(262) 679-4100

DNR Contact:

RATARASARN, THANINT
DNR 407 Pilot CT, Suite 100
Waukesha, WI 53188
(262) 574-2134

Group Description:	Entry Point:	Monitoring Instructions:	
Coliform Bacteria	Distribution	Take 9 samples every month during calendar year 2002	
Gross Alpha (Radioactivity Form)	8	Take 1 sample between 01/01/02 and 09/30/02	
	2	Take 1 sample between 01/01/02 and 09/30/02	Complete
	3	Take 1 sample between 01/01/02 and 09/30/02	Complete
	4	Take 1 sample between 01/01/02 and 09/30/02	Complete
	5	Take 1 sample between 01/01/02 and 09/30/02	Complete
	6	Take 1 sample between 01/01/02 and 09/30/02	Complete
	7	Take 1 sample between 01/01/02 and 09/30/02	Complete
Inorganics	8	Take 1 sample between 01/01/02 and 09/30/02	
		620 NITRATE AS N	
		929 SODIUM TOTAL	
	2	Take 1 sample between 01/01/02 and 09/30/02	Complete
		1097 ANTIMONY TOTAL	
		1002 ARSENIC TOTAL	
		1007 BARIUM TOTAL	
		1012 BERYLLIUM TOTAL	
		1027 CADMIUM TOTAL	
		1034 CHROMIUM TOTAL	
		951 FLUORIDE TOTAL	
		71900 MERCURY TOTAL	
		1067 NICKEL TOTAL	
		630 NITRATE+NITRITE	
		615 NITRITE (NO2-N) TOTAL	
		1147 SELENIUM TOTAL	
		929 SODIUM TOTAL	
		1059 THALLIUM TOTAL	
	3	Take 1 sample between 01/01/02 and 09/30/02	Complete
		1097 ANTIMONY TOTAL	
		1002 ARSENIC TOTAL	
		1007 BARIUM TOTAL	
		1012 BERYLLIUM TOTAL	
		1027 CADMIUM TOTAL	
		1034 CHROMIUM TOTAL	
		951 FLUORIDE TOTAL	
		71900 MERCURY TOTAL	
		1067 NICKEL TOTAL	
		630 NITRATE+NITRITE	
		615 NITRITE (NO2-N) TOTAL	
		1147 SELENIUM TOTAL	
		929 SODIUM TOTAL	
		1059 THALLIUM TOTAL	
	4	Take 1 sample between 01/01/02 and 09/30/02	Complete
		1097 ANTIMONY TOTAL	
		1002 ARSENIC TOTAL	
		1007 BARIUM TOTAL	
		1012 BERYLLIUM TOTAL	
		1027 CADMIUM TOTAL	
		1034 CHROMIUM TOTAL	
		951 FLUORIDE TOTAL	
		71900 MERCURY TOTAL	

Wisconsin Department of Natural Resources
Drinking Water System
Monitoring Requirements
Monitoring Schedule for Public Systems
Period: 01/01/2002 to 12/31/2002

		1067	NICKEL TOTAL	
		630	NITRATE+NITRITE	
		615	NITRITE (NO2-N) TOTAL	
		1147	SELENIUM TOTAL	
		929	SODIUM TOTAL	
		1059	THALLIUM TOTAL	
5	Take 1 sample between 01/01/02 and 09/30/02			Complete
		1097	ANTIMONY TOTAL	
		1002	ARSENIC TOTAL	
		1007	BARIUM TOTAL	
		1012	BERYLLIUM TOTAL	
		1027	CADMIUM TOTAL	
		1034	CHROMIUM TOTAL	
		951	FLUORIDE TOTAL	
		71900	MERCURY TOTAL	
		1067	NICKEL TOTAL	
		630	NITRATE+NITRITE	
		615	NITRITE (NO2-N) TOTAL	
		1147	SELENIUM TOTAL	
		929	SODIUM TOTAL	
		1059	THALLIUM TOTAL	
6	Take 1 sample between 01/01/02 and 09/30/02			Complete
		1097	ANTIMONY TOTAL	
		1002	ARSENIC TOTAL	
		1007	BARIUM TOTAL	
		1012	BERYLLIUM TOTAL	
		1027	CADMIUM TOTAL	
		1034	CHROMIUM TOTAL	
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		929	SODIUM TOTAL	
		1059	THALLIUM TOTAL	
7	Take 1 sample between 01/01/02 and 09/30/02			Complete
		1097	ANTIMONY TOTAL	
		1002	ARSENIC TOTAL	
		1007	BARIUM TOTAL	
		1012	BERYLLIUM TOTAL	
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		615	NITRITE (NO2-N) TOTAL	
		1147	SELENIUM TOTAL	
		929	SODIUM TOTAL	
		1059	THALLIUM TOTAL	
Lead and copper	Distribution	Take 20 samples during calendar year 2002		Complete
Volatile Organic Sample - Pop < 10000	8	Take 1 sample between 01/01/02 and 09/30/02		Complete
	2	Take 1 sample between 01/01/02 and 09/30/02		Complete
	3	Take 1 sample between 01/01/02 and 09/30/02		Complete
	4	Take 1 sample between 01/01/02 and 09/30/02		Complete
	5	Take 1 sample between 01/01/02 and 09/30/02		Complete
	6	Take 1 sample between 01/01/02 and 09/30/02		Complete
	7	Take 1 sample between 01/01/02 and 09/30/02		Complete

Waivers:

Wisconsin Department of Natural Resources
**Drinking Water System
Monitoring Requirements**
Monitoring Schedule for Public Systems
Period: 01/01/2002 to 12/31/2002

Asbestos (Inorganic Report Form)	2	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	3	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	4	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	5	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	6	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	7	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	8	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	2	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	3	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	4	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	5	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	6	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	7	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	8	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	2	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	3	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	4	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	5	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	6	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	7	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	8	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	2	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	3	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	4	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	5	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	6	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	7	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	8	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	2	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	3	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	4	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	5	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	6	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	7	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	8	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	2	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	3	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	4	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	5	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	6	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	7	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	8	Waiver issued - No sampling required during calendar year 2002

CCR Requirements: Your system must complete and distribute a Consumer Confidence Report for the previous calendar year by July 1st. Certification of the CCR must be completed and sent to the DNR by October 1st. Instructions and a template for creating a CCR are available at:
www.dnr.state.wi.us/org/water/dwg/ccr/ccr_instructions.htm

Number of System on Report: 1

Wisconsin Department of Natural Resources
Drinking Water System
Monitoring Requirements
Monitoring Schedule for Public Systems

Date: 10/24/2003 11:58:27 AM

Comments

Start Date: 01/01/2002

End Date: 12/31/2002

County:

Region:

PWS Type:

DS Status:

PWS IDs: and inv.pws_id in (26817417)

Service Type:

Extra PWS:

Extra PWS A

Extra PWS B:

Monitor Group

Sort Order:

Wisconsin Department of Natural Resources
Drinking Water System
Monitoring Requirements
Monitoring Schedule for Public Systems
Period: 01/01/2002 to 12/31/2002

System Type: MC - Municipal Community
 Region: Southeast Region (2)
 County: Waukesha (58)

MUSKEGO WATER UTILITY
26817417 City: MUSKEGO
 Pop: 8000

Sampler Information:

Public Utilities Supt Scott Kloskowski
 W189 S8235 Mercury Dr P O Box 903
 Muskego, WI 53150
 (262) 679-4128

Owner Information:

Muskego City Clerk
 W182 S8200 RACINE AVE
 Muskego, WI 53150
 (262) 679-4100

DNR Contact:

RATARASARN, THANINTR
 DNR 407 Pilot CT, Suite 100
 Waukesha, WI 53188
 (262) 574-2134

Group Description:	Entry Point:	Monitoring Instructions:	
Coliform Bacteria	Distribution	Take 9 samples every month during calendar year 2002	
Gross Alpha (Radioactivity Form)	8	Take 1 sample between 01/01/02 and 09/30/02	Complete
	2	Take 1 sample between 01/01/02 and 09/30/02	Complete
	3	Take 1 sample between 01/01/02 and 09/30/02	Complete
	4	Take 1 sample between 01/01/02 and 09/30/02	Complete
	5	Take 1 sample between 01/01/02 and 09/30/02	Complete
	6	Take 1 sample between 01/01/02 and 09/30/02	Complete
	7	Take 1 sample between 01/01/02 and 09/30/02	Complete
Inorganics	8	Take 1 sample between 01/01/02 and 09/30/02	
		620 NITRATE AS N	
		929 SODIUM TOTAL	
	2	Take 1 sample between 01/01/02 and 09/30/02	Complete
		1097 ANTIMONY TOTAL	
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	3	Take 1 sample between 01/01/02 and 09/30/02	Complete
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		1007 BARIUM TOTAL	
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Attachment 1
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Wisconsin Department of Natural Resources
Drinking Water System
Monitoring Requirements
Monitoring Schedule for Public Systems
Period: 01/01/2002 to 12/31/2002

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		1067	NICKEL TOTAL	
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		1147	SELENIUM TOTAL	
		929	SODIUM TOTAL	
		1059	THALLIUM TOTAL	
Lead and copper	Distribution	Take 20 samples during calendar year 2002		Complete
Volatile Organic Sample - Pop < 10000	8	Take 1 sample between 01/01/02 and 09/30/02		Complete
	2	Take 1 sample between 01/01/02 and 09/30/02		Complete
	3	Take 1 sample between 01/01/02 and 09/30/02		Complete
	4	Take 1 sample between 01/01/02 and 09/30/02		Complete
	5	Take 1 sample between 01/01/02 and 09/30/02		Complete
	6	Take 1 sample between 01/01/02 and 09/30/02		Complete
	7	Take 1 sample between 01/01/02 and 09/30/02		Complete

Waivers:

Wisconsin Department of Natural Resources

Drinking Water System

Monitoring Requirements

Monitoring Schedule for Public Systems

Period: 01/01/2002 to 12/31/2002

Asbestos (Inorganic Report Form)	2	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	3	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	4	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	5	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	6	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	7	Waiver issued - No sampling required during calendar year 2002
Asbestos (Inorganic Report Form)	8	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	2	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	3	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	4	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	5	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	6	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	7	Waiver issued - No sampling required during calendar year 2002
Benzo(A)Pyrene (Synthetic Form)	8	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	2	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	3	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	4	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	5	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	6	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	7	Waiver issued - No sampling required during calendar year 2002
Cyanide (Inorganic Report Form)	8	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	2	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	3	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	4	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	5	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	6	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	7	Waiver issued - No sampling required during calendar year 2002
Dioxin (Synthetic Report Form)	8	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	2	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	3	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	4	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	5	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	6	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	7	Waiver issued - No sampling required during calendar year 2002
EDB/DBCP (Synthetic Report Form)	8	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	2	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	3	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	4	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	5	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	6	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	7	Waiver issued - No sampling required during calendar year 2002
Industrial Chemicals (Synthetic Form)	8	Waiver issued - No sampling required during calendar year 2002

CCR Requirements: Your system must complete and distribute a Consumer Confidence Report for the previous calendar year by July 1st. Certification of the CCR must be completed and sent to the DNR by October 1st. Instructions and a template for creating a CCR are available at:
www.dnr.state.wi.us/org/water/dwg/ccr/ccr_instructions.htm

Number of System on Report: 1

FROM COMMERCIAL LABORATORIES

Form: 3300-218

Section I: To be completed by the Department of Natural Resources

System Name: MUSKEGO WATER UTILITY

City: MUSKEGO

Pws Id#: 26817417

County Code: 68

Route Code: WS20

Sys Well No: 7

Entry Point ID: 7

WI Unique Well No: KW594

(262) 679-4128

Scott Kloskowski

W189 S8235 MERCURY DR. P O BOX 903

MUSKEGO WI 53150

This form must be submitted with laboratory samples analyzed to determine compliance with ch. NR 809, Wis. Adm. Code, Safe Drinking Water. Completion of this form or a similar form approved by the Department is mandatory. Failure to submit a completed form to the Department is a violation punishable by a forfeiture of no less than \$10 nor more than \$5000, or by a fine of not less than \$10 nor more than \$100 or imprisonment of not less than 30 days, or both. Each day of continued violation is a separate offense (ss. 144.99, Wis. Stats.). Authorization for these requirements is under s. 162.03(j), Wis. Stats. and ch. NR 809.80(9). Personally identifiable information on this form will be used for no other purpose.

Sample Point Description:

System Type:

☒ (MC) Municipal Community

☐ (OC) OTM Community

☐ (NN) Nontransient Noncommunity

☐ (TN) Transient Noncommunity

Source Code:

☐ W Well

☒ E Entry Point

☐ D Distribution

Sample Type:

☒ D (SDWA) Compliance Sample

☐ C (SDWA) Confirmation

☐ W Raw Water Sample

☐ I Investigation Sample

(Initial Sample Date)

Collect sample by: 12/31/2000

Return results to DNR by: 01/10/2001

Section II: To be completed by SAMPLER

Sample Collection Date(s): 2/22/00

Time: 12:20

Sample Point Address: Well #7 W200 S8237 Janesville Rd

Sample Point Descrip: Sample tap

First Initial and

Last Name of Sampler: J. Mayer

Section III: To be completed by LABORATORY OFFICIAL. Report analytical results on back.

Laboratory

ID Number:

Laboratory

Name:

Date Sample

Received: FEB 23 2000

Time Sample

Received:

Laboratory

Sample ID:

OK002461

Signature of

Receiving Lab Official:

Date Reported:

Condition of

Sample Upon Receipt:

Section IV: To be completed by WATER SUPPLY SYSTEM OFFICIAL after analysis has been done.

I certify that I personally examined and am familiar with all information submitted on this document and all attachments and that, based on my inquiry of those individuals responsible for obtaining the information, I believe that the information is true and accurate, and complete. I also certify that the values being submitted are the actual values found in the sample; no values have been modified or changed in any manner.

Signature:

Title:

Rev: 11/98

Date Signed:

3/9/02

TEMP °C

ANALYST

Storet Code	Parameter	SDWA Method	MDL	Results	MCL	Units
34010	X BENZENE				5	UG/L
32102	X CARBON TETRACHLORIDE				5	UG/L
34536	X 1,2-DICHLOROBENZENE (O-)				600	UG/L
34571	X 1,4-DICHLOROBENZENE (P-)				75	UG/L
34531	X 1,2-DICHLOROETHANE				5	UG/L
34501	X 1,1-DICHLOROETHYLENE				7	UG/L
77093	X 1,2-DICHLOROETHYLENE CIS				70	UG/L
34546	X 1,2-DICHLOROETHYLENE, TRA				100	UG/L
34423	X DICHLOROMETHANE				5	UG/L
34541	X 1,2-DICHLOROPROPANE				5	UG/L
34371	X ETHYL BENZENE				700	UG/L
34301	X CHLOROBENZENE				100	UG/L
77128	X STYRENE				100	UG/L
34475	X TETRACHLOROETHYLENE				5	UG/L
34010	X TOLUENE				1000	UG/L
34551	X 1,2,4-TRICHLOROBENZENE				70	UG/L
34506	X 1,1,1-TRICHLOROETHANE				200	UG/L
34511	X 1,1,2-TRICHLOROETHANE				5	UG/L
39180	X TRICHLOROETHYLENE				5	UG/L
39175	X VINYL CHLORIDE				0.2	UG/L
79724	X XYLENE TOTAL				10000	UG/L

* Health Advisory

Approved By QA Officer: _____

Date: _____

Laboratory Manager: Daniel Steinhilber

Date: 03/07/00

Comments: _____

State Laboratory of Hygiene
University of Wisconsin Center for Health Sciences
2601 Agriculture Drive, Madison, WI 53707-7996

R.H. Laessig, Ph.D., Director

D.F. Kurtycz, M.D., Medical Director

Environmental Science Section
Organic Chemistry

(608) 224-6269

DNR LAB ID 113133790

SCOTT KLOSKOWSKI
W189 S8235 MERCURY DRIVE
MUSKEGO, WI 53150

System Name: MUSKEGO WATER UTILITY

PWS ID#: 26817417

County Code: 58 (Waukesha)

City: MUSKEGO

Route Code: WS20

System Well No: 7

Entry Point ID: 7

WI Unique Well No: KW594

System Type: Municipal community

Source Code: Entry Point

Sample Type: (SDWA) Compliance Sample

Sample Collection Date: 02/22/00

Sample Collection Time: 12:20

Sample Point Address: WELL #7 W200 S8227 JANESVILLE RD

Sample Point Description: SAMPLE TAP

Name of Sampler: G MAYER

Date Received: 02/23/00

Sample ID: OK002461

Date Reported: 03/07/00

---- test: VOCS IN WATER BY GCMS - EPA METHOD 524.2

BENZENE	ND (LOD=0.15 UG/L)
BROMOBENZENE	ND (LOD=0.15 UG/L)
BROMOCHLOROMETHANE	ND (LOD=0.15 UG/L)
BROMODICHLOROMETHANE	ND (LOD=0.15 UG/L)
BROMOFORM	ND (LOD=0.15 UG/L)
BROMOMETHANE	ND (LOD=0.15 UG/L)
N-BUTYLBENZENE	ND (LOD=0.15 UG/L)
SEC-BUTYLBENZENE	ND (LOD=0.15 UG/L)
TERT-BUTYLBENZENE	ND (LOD=0.15 UG/L)
CARBON TETRACHLORIDE	ND (LOD=0.15 UG/L)
CHLOROBENZENE	ND (LOD=0.15 UG/L)
CHLOROETHANE	ND (LOD=0.15 UG/L)
CHLOROFORM	ND (LOD=0.15 UG/L)
CHLOROMETHANE	ND (LOD=0.15 UG/L)
2-CHLOROTOLUENE	ND (LOD=0.15 UG/L)
4-CHLOROTOLUENE	ND (LOD=0.15 UG/L)
DIBROMOCHLOROMETHANE	ND (LOD=0.15 UG/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND (LOD=0.20 UG/L)
1,2-DIBROMOETHANE (EDB)	ND (LOD=0.15 UG/L)
DIBROMOMETHANE	ND (LOD=0.15 UG/L)

State Laboratory of Hygiene
University of Wisconsin Center for Health Sciences
2601 Agriculture Drive, Madison, WI 53707 7996

R.H. Laessig, Ph.D., Director

D.F. Kurtycz, M.D., Medical Director

Environmental Science Section (608) 224-6269 DNR LAB ID 113133790
... continuing Sample ID: OK002461 PWS ID#: 26817417 Entry Point ID: 7

1,2-DICHLOROBENZENE	ND (LOD=0.15 UG/L)
1,3-DICHLOROBENZENE	ND (LOD=0.15 UG/L)
1,4-DICHLOROBENZENE	ND (LOD=0.15 UG/L)
DICHLORODIFLUOROMETHANE	ND (LOD=0.20 UG/L)
1,1-DICHLOROETHANE	ND (LOD=0.15 UG/L)
1,2-DICHLOROETHANE	ND (LOD=0.15 UG/L)
1,1-DICHLOROETHYLENE	ND (LOD=0.15 UG/L)
CIS-1,2-DICHLOROETHYLENE	ND (LOD=0.15 UG/L)
TRANS-1,2-DICHLOROETHYLENE	ND (LOD=0.15 UG/L)
1,2-DICHLOROPROPANE	ND (LOD=0.15 UG/L)
1,3-DICHLOROPROPANE	ND (LOD=0.15 UG/L)
2,2-DICHLOROPROPANE	ND (LOD=0.15 UG/L)
1,1-DICHLOROPROPENE	ND (LOD=0.15 UG/L)
CIS-1,3-DICHLOROPROPENE	ND (LOD=0.15 UG/L)
TRANS-1,3-DICHLOROPROPENE	ND (LOD=0.15 UG/L)
ETHYLBENZENE	ND (LOD=0.15 UG/L)
HEXACHLOROCYCLOHEPTADIENE	ND (LOD=0.15 UG/L)
ISOPROPYLBENZENE	ND (LOD=0.15 UG/L)
P-ISOPROPYLTOLUENE	ND (LOD=0.15 UG/L)
METHYL-TERT-BUTYL ETHER	ND (LOD=0.15 UG/L)
METHYLENE CHLORIDE	ND (LOD=0.15 UG/L)
NAPHTHALENE	ND (LOD=0.15 UG/L)
N-PROPYLBENZENE	ND (LOD=0.15 UG/L)
STYRENE	ND (LOD=0.15 UG/L)
1,1,1,2-TETRACHLOROETHANE	ND (LOD=0.20 UG/L)
1,1,2,2-TETRACHLOROETHANE	ND (LOD=0.15 UG/L)
TETRACHLOROETHYLENE	ND (LOD=0.15 UG/L)
TOLUENE	ND (LOD=0.15 UG/L)
1,2,3-TRICHLOROBENZENE	ND (LOD=0.15 UG/L)
1,2,4-TRICHLOROBENZENE	ND (LOD=0.15 UG/L)
1,1,1-TRICHLOROETHANE	ND (LOD=0.15 UG/L)
1,1,2-TRICHLOROETHANE	ND (LOD=0.15 UG/L)
TRICHLOROETHYLENE	ND (LOD=0.15 UG/L)
TRICHLOROFLUOROMETHANE	ND (LOD=0.15 UG/L)
1,2,3-TRICHLOROPROPANE	ND (LOD=0.15 UG/L)
1,2,4-TRIMETHYLBENZENE	ND (LOD=0.15 UG/L)
1,3,5-TRIMETHYLBENZENE	ND (LOD=0.15 UG/L)
VINYL CHLORIDE	ND (LOD=0.20 UG/L)
M/P-XYLENE	ND (LOD=0.15 UG/L)
O-XYLENE	ND (LOD=0.15 UG/L)

State Laboratory of Hygiene
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2601 Agriculture Drive, Madison, WI 53707-7996

R.H. Laessig, Ph.D., Director D.F. Kurtycz, M.D., Medical Director

Environmental Science Section (608) 224-6269 DNR LAB ID 113133790
... continuing Sample ID: OK002461 PWS ID#: 26817417 Entry Point ID: 7

VOCS IN WATER BY GC/MS - PREP - METHOD 524.2 C

---- test: TEMPERATURE ON RECEIPT-ICED - 0950

TEMPERATURE ON RECEIPT-ICED

ICED

VOCS IN WATER BY GC/MS - PREP - EPA METHOD 524.2

C

--- Footnotes ---

ND means "NOT DETECTED". Result is below the level of detection (LOD)

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 8

**INFORMATION OBTAINED DURING SITE INSPECTION
AND PHOTOGRAPHS**

Water Quality Wells - Muskego Landfill

Water-Level-Only Wells - Muskego Landfill

7/15/04

Semi-annual

E17R *OK*
 E80 *OK*
 E92P *OK*
 E93P *OK*
 E93D *OK*
 E94 *OK*
 E94P *OK*
 E95 *OK*
 E95P *OK*
 E102A *OK*
 E123B *OK*
 E135A *OK*
 E135B *OK*
 E137A *OK*
 E140 *OK*
 E141A *OK*
 E141B *OK*
 EW01 *OK*
 EW02 *OK*
 EW03R *OK*
 P64C *OK*
 P67A *OK*
 TW62 *OK*
 TW74R *OK*

E17 *OK*
 E48 *OK*
 E52P *OK*
 E55 *OK*
 E87 *OK*
 E90 *Semi-annual* *OK*
 E91A *Semi-annual* *OK*
 E92 *OK*
 E92A *OK*
 E92P *OK*
 E93 *OK (in 1100)*
 E96 *OK*
 E96P *OK*
 E100A *OK*
 E104 *OK*
 E137B *OK*
 E138A *OK*
 E138B *OK*
 OW01 *OK*
 OW02 *OK*
 OW03 *OK*
 OW04 *OK*
 OW05 *OK*
 P64A *OK*

Water Quality Wells - Muskego Landfill

Water-Level-Only Wells - Muskego Landfill

P64B OK

P67B OK

TW70 OK

TW75 OK

photos

MUSKEGO SANITARY LANDFILL

Second Five-Year Review Inspection
JULY 15, 2004

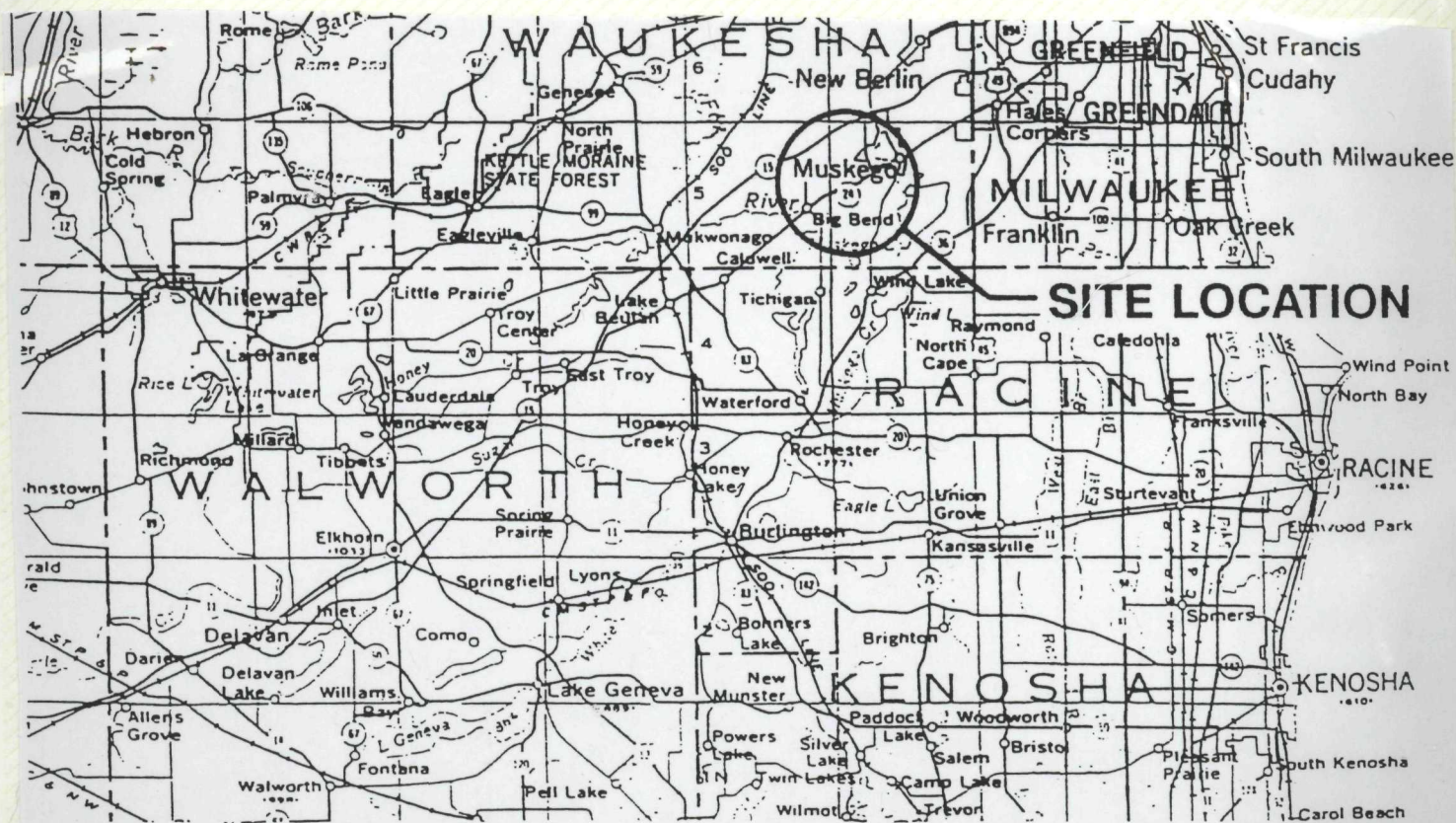
**Muskego Sanitary Landfill Site
Photograph**





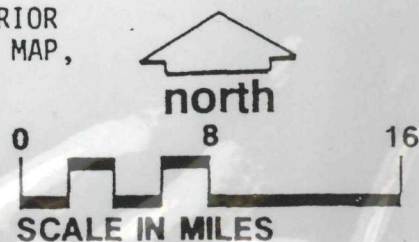
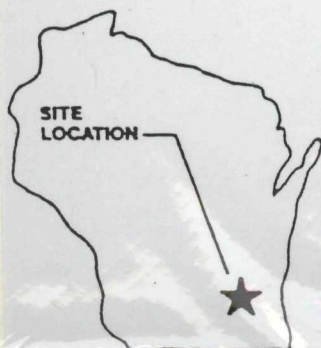


SITE ENTRANCE



NOTE

1. SITE LOCATION MAP DEVELOPED FROM THE UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY STATE OF WISCONSIN MAP, DATED 1984.





**WELL MAINTAINED FENCING
SURROUNDING THE SITE**

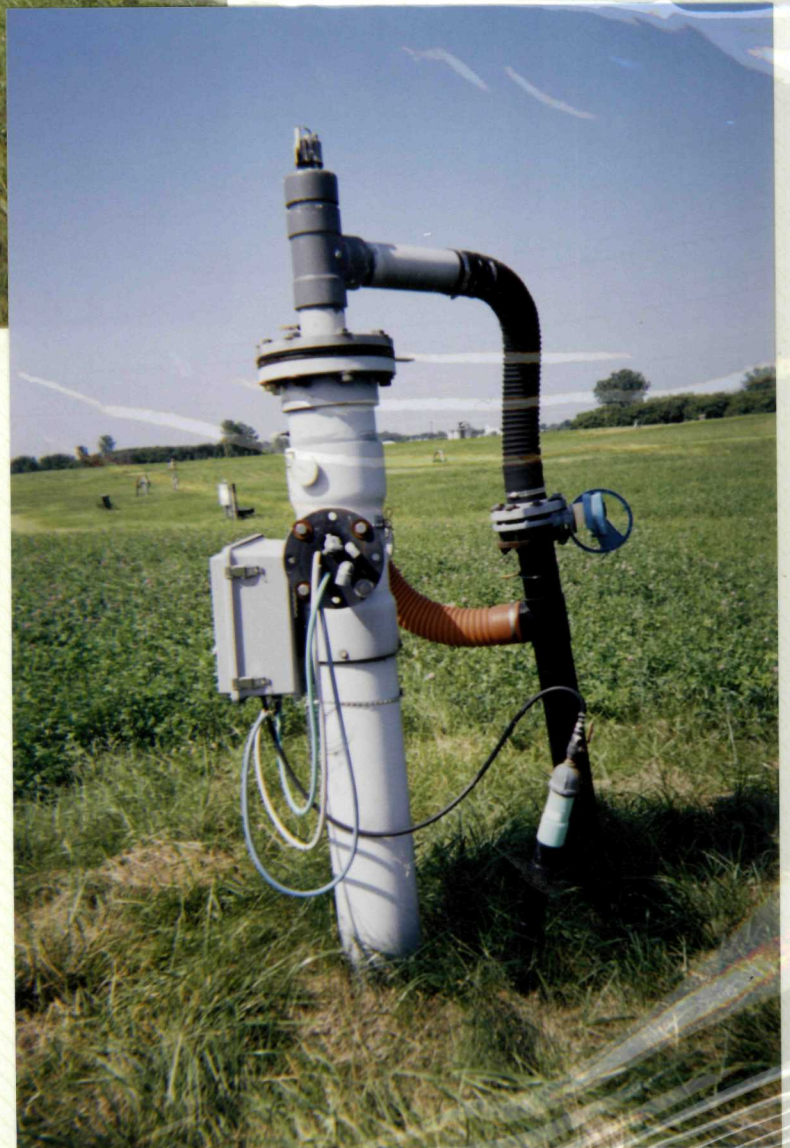


VIEW FROM TOP OF LANDFILL





DUAL EXTRACTION WELLS





**TYPICAL WELL-MAINTAINED
GROUNDWATER MONITORING WELL**





GAS FLARE SYSTEM



**INTERIOR OF
MAINTENANCE BUILDING**

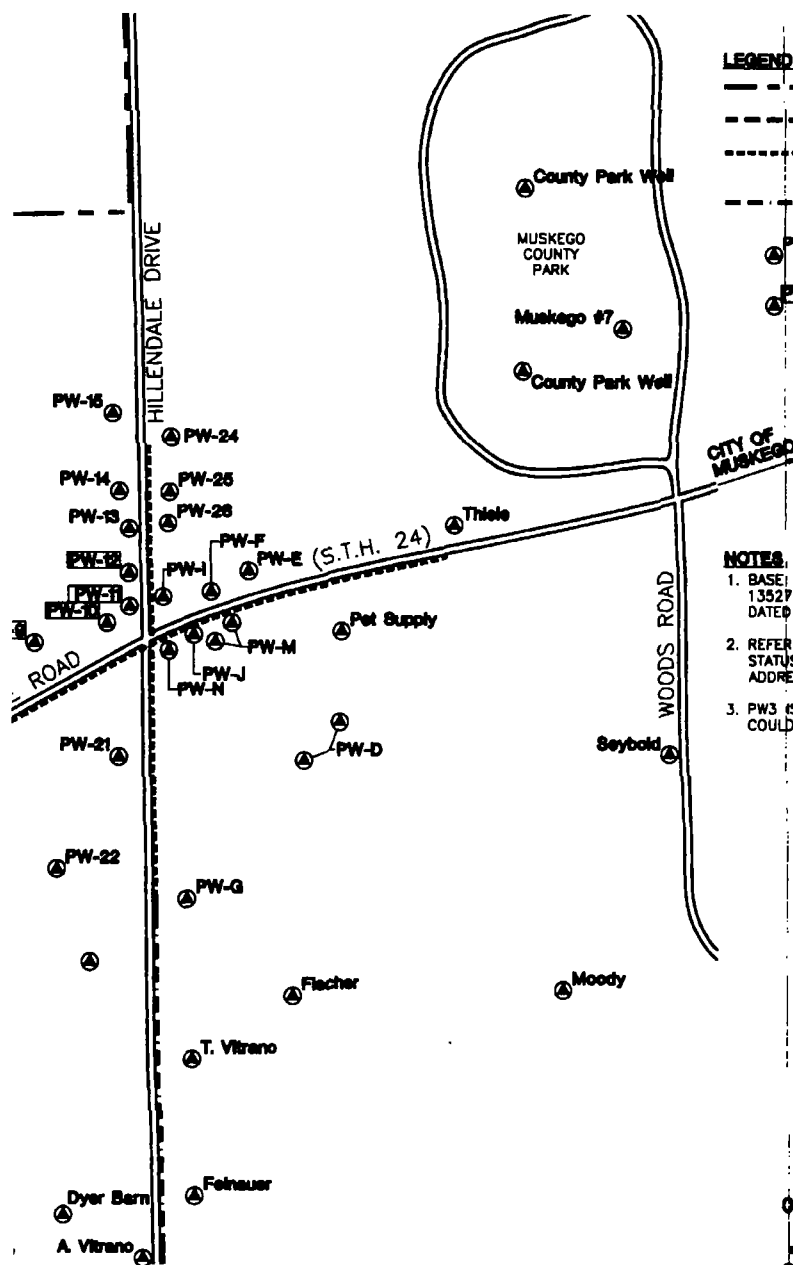






ON-SITE PONDS



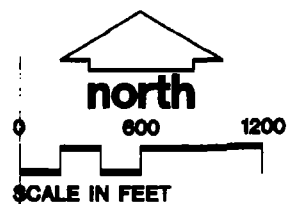


LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF REFUSE
- CITY OF MUSKEGO PUBLIC WATER SYSTEM (1986)
- CITY OF MUSKEGO PUBLIC WATER SYSTEM (2000)
- ④ PW-3 PRIVATE WELL/RESIDENT LOCATION AND NUMBER
- ④ PW-2 PRIVATE WELL/RESIDENT LOCATION AND NUMBER (8/91 EPA SAMPLING FOR RI)

NOTES

1. BASE MAP DEVELOPED FROM DRAWING 13527-B25 PREPARED BY WARZYN INC., DATED JANUARY 13, 1992.
2. REFER TO TABLE 12 OF THE RI REPORT FOR STATUS OF PRIVATE WELLS AND RESIDENT ADDRESSES.
3. PW3 IS BELIEVED TO BE ABANDONED, BUT COULD NOT BE CONFIRMED.





ENTRANCE TO COUNTY PARK

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 9

LIST OF CONTRACTORS PERFORMING O & M

MUSKEGO LANDFILL OPERATIONS AND MAINTENANCE CONTRACTORS

Source Control Operable Unit

Mowing/Snow Plowing

J&O Trucking
Muskego, Wisconsin
John Jewell
(414) 422-9223

Gas System Monitoring & Adjustment

RMT, Inc.
Madison, Wisconsin
Jack Anderson
(608) 831-4444

Gas System Maintenance & Repair

Sting Field Services
Hartland, Wisconsin
Scott Stair
(262) 673-5068

Terra Engineering & Construction
Madison, Wisconsin
John Karsten
(608) 221-3501

American Electric
Franksville, Wisconsin
Ed Hrovatin
(414) 525-3252

Survey Services

Bernklau Surveying
Sussex, Wisconsin
Tom Bernklau
(262) 246-0718

Cap Maintenance/Repair

J&O Trucking
Muskego, Wisconsin
John Jewell
(414) 422-9223

Terra Engineering & Construction
Madison, Wisconsin
John Karsten

(608) 221-3501

Leachate Collection System Monitoring & Adjustment

Waste Management of Wisconsin, Inc.
Franklin, Wisconsin
Dave Koch
(414) 529-6180

Leachate Collection System Maintenance/Repair

QED Environmental Systems, Inc.
Ann Arbor, Michigan
Suzanne Schmidt
(800) 624-2026

American Electric
Franksville, Wisconsin
Ed Hrovatin
(414) 525-3252

Terra Engineering & Construction
Madison, Wisconsin
John Karsten
(608) 221-3501

Engineering Technical Services

RMT, Inc.
Madison, Wisconsin
Mark Torresani
(608) 831-4444

Earth Tech, Inc.
Sheboygan, Wisconsin
Doug Graham
(920) 458-8711

Seeding/Fertilizing Services

Jerry Berg, LLC
Sturtevant, Wisconsin
Jerry Berg
(262) 206-1268

Natural Environmental Reclamation Concepts
Hanover, Michigan
Patrick O'Shea
(517) 563-2898

MUSKEGO LANDFILL OPERATIONS AND MAINTENANCE CONTRACTORS

Groundwater Control Operable Unit

Groundwater Sampling

Waste Management of Wisconsin, Inc.
Menomonee Falls, Wisconsin
Gerard Hamblin
(262) 253-8620

Groundwater Analysis

Severn Trent Laboratories – Buffalo
Amherst, New York
Candice Fox
(716) 691-2600

Groundwater Extraction System Monitoring/Adjustment

Waste Management of Wisconsin, Inc.
Franklin, Wisconsin
Dave Koch
(414) 529-6180

Groundwater Extraction System Maintenance/Repair

American Electric, Inc.
Franksville, Wisconsin
Ed Hrovatin
(414) 525-3252

Terra Engineering & Construction
Madison, Wisconsin
John Karsten
(608) 221-3501

Boart Longyear Company
Schofield, Wisconsin
Ron Thalacker
(715) 359-7090

Engineering/Hydrogeologic Technical Services

MWH Americas, Inc.
Madison, Wisconsin
Ken Quinn
(608) 231-4747

2.0 GROUNDWATER SAMPLING AND ANALYSIS

2.1 GROUNDWATER MONITORING POINTS

The selected groundwater monitoring wells and private wells are shown on Drawing No. 3 and listed in Table 2-1. Rationale for their sampling and analysis are also included in Table 2-1.

2.2 GROUNDWATER ANALYTES AND SCHEDULE

Listed below are the groundwater monitoring well events and the parameters to be analyzed.

I. Quarterly:

<u>Wells</u>		<u>Quarterly Parameters</u>
E17R	EW-2	Indicators:
E92P	E102A	pH (Field)
E93P	E135A	Specific Conductance (Field)
E93D	E135B	Groundwater Elevation (Field)
E94	E137A	Temperature (Field)
E94P	E140	Chloride (Filtered)
E95	P64C	Sulfate (Filtered)
E95P	P67A	Total Alkalinity (Filtered)
TW62	TW74R	
E80	E123B	
E141A	E141B	
EW-1	EW-3R	

II. Annually:

<u>Wells</u>		<u>Annual Parameters</u>
E17R	EW-2	Volatile Organic Compounds (VOCs)
E92P	E102A	TDS
E93P	E135A	COD
E93D	E135B	USEPA Target Analyte List Metals (Filtered)
E94	E137A	
E94P	E140	
E95	P64C	Arsenic
E95P	P67A	Barium
TW62	TW74R	Chromium
E80	E123B	Iron
E141A	E141B	Selenium
EW-1	EW-3R	Thallium
		Manganese
		Silver
		Cadmium
		Lead

III. Semi-Annually:

<u>Wells</u>				<u>Parameters</u>
E48	E91A	E100A	TW70	Water Levels
E52P	E92A	E104	TW75	
E90	E92P	E137B	E17	
E87	E96	E138A	E92	
E67B	E96P	E138B	E55	
E93	P64A	P64B		
OW-1	OW-2	OW-3	OW-4	
OW-5				
EW-1	EW-2	EW-3R		Volatile Organic Compounds (VOCs)

2.3 SAMPLING AND ANALYSIS PROCEDURES

This section addresses the procedures to be used for sampling the wells in the monitoring program and analyzing collected samples.

2.3.1 Water Level Measurements

A general set of procedures will be followed prior to water level or sample collection at wells. The condition of the well and its surrounding area will be recorded on the Well Sampling Record (or similar form) and in the field logbook.

Information to be noted includes:

- Condition of the well including locking cap and key if appropriate.
- Well integrity, including condition of well's cement footing and protective casing. In addition, note physical surroundings, obstructions or kinks in the well casing, water in annular space, evidence of flooding, vandalism, etc.
- Weather conditions (i.e., wind direction, temperature, precipitation).
- Evidence of contamination.
- Well "guard post" condition (if installed).

Water level measurements will be taken with a portable electric tape. Measurements will be taken to the nearest 0.01 foot. The measurements will be recorded on the Water Level Record. The data from monitoring wells will be tabulated and water level maps generated to determine flow directions and gradients.

NUSEGO SANITARY LANDFILL SITE
JUNE 1992

Table 12
Status of Private Wells

<u>Resident/Well</u>	<u>Address</u>	<u>Public Water Available, But Not Connected; Using Private Well</u>	<u>Using Public Water Supply - Private Well Not Abandoned</u>	<u>Well Abandoned</u>
Dorothy Keith (PW15)	W208 S8241 Hillendale Dr.	X		
Ronald & C Neitzel (PW-24)	W207 S8250 Hillendale Dr.		X	
Lawrence Schmidt (PW14)	W208 S8285 Hillendale Dr.	X		
Frank Aiappa (PW-25)	W207 S8286 Hillendale Dr.		X	
Howard Kleinman (PW-13)	W208 S8307 Hillendale Dr.		X	
Gary Peters (PW-26)	W207 S8312 Hillendale Dr.		X	
Mark Sawyer (PW-12)	W208 S8349 Hillendale Dr.		X(1)	
Gerry Schimmel (PW-11)	W208 S8381 Hillendale Dr.		X	
Melvin Ackman (PW-21)	W208 S8401 Hillendale Dr.		X	
Kenneth Purdy (PW-22)	W208 S8440 Hillendale Dr.		X	
Herbert Sachman (PW-3)	W207 S8480 Hillendale Dr.		X(2)	
Klem Kusikowski (PW-3)	S86 W21405 Janesville Rd.			X(2)(3)
Moses Lodge (PW-2)	S86 W21403 Janesville Rd.		X	
Camille Reaky (PW-4)	S85 W21331 Janesville Rd.	X(1)		
Robert Scofield (PW-3)	S85 W21412 Janesville Rd.			X
Resident (PW-6)	S85 W21364 Janesville Rd.			X
WMWI Well Replacing PW-4, PW-5, PW-6 (PW-27)	S85 W21364 Janesville Rd.	X(2)		
Stagecoach Inn (PW-8)	S85 W21175 Janesville Rd.	X(4)		
Arthur Zangerle (PW-9)	S84 W20938 Janesville Rd.		X(1)	
Mike Dabick (PW-10)	S84 W20858 Janesville Rd.	X(4)		
VFW (PW1)	S83 W20773 Janesville Rd.		X	
Wm. J. Whitehouse (PW-N)	S83 W20743 Janesville Rd.		X	
Vernon Eder (PW-J)	S83 W20729 Janesville Rd.		X	
Resident	S83 W20727 Janesville Rd.	X		
Rental (PW-M)	S83 W20703 Janesville Rd.	X		
Greg Pasky (PW-F)	S83 W20702 Janesville Rd.		X	
Edward Magoske (PW-M)	S83 W20671 Janesville Rd.	X(4)		
John Krabbenhoft (PW-E)	S83 W20618 Janesville Rd.	X		
Donald Burg (PW-D)	S83 W20607 Janesville Rd.	X		
John Burg (PW-D)	S83 W20605 Janesville Rd.	X		
Jacobi (WMNA)(PW-1)	W217 S8464 Crowbar Rd.			X
Dun Ross (PW-28)	W217 S8790 Crowbar Rd.		X	
Anamax Rendering Plant (PW20)	Water Lane	X(2)		

FOOTNOTES:

- (1) Well water provides water for livestock or animals.
- (2) Deep well in sandstone bedrock (verified).
- (3) Could not verify status of water supply.
- (4) Well screened in sand and gravel (verified).
- (5) Well is believed to be abandoned. Could not verify.

NOTES:

1. Refer to Drawing 13527-B14 of this report for map locations of each private well/residence.
2. Refer to the Site Evaluation Report (SER) (Waryn, 1984), for available private well logs.
3. This Table was originally Table 12 from the Supplement to Technical Memorandum No. 2.

TJK/kml/VLV
[mad-403-76a]
13527.33

OTHER WHICH YOU MAY FIND REFERENCE TO:

PWH - L & G. FISCHER

PWTHIL - K. THIELE

VITRAN - A. VITRANO

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 10

**EXISTING GROUNDWATER MONITORING PLAN AND MAP
DEPICTING WELL NETWORK**

MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report

EXHIBIT 11

**EXAMPLES OF REQUIRED PRP SUBMISSIONS PURSUANT TO THE
UNILATERAL ADMINISTRATIVE ORDERS IMPLEMENTING THE
GWOU AND SCOU RODS**

**Muskego Site Groundwater Remediation Group
Committee Correspondence
Address Writer at
N96 W13600 County Line Road
Germantown, WI 53022**

May 15, 2003

Ms. Sheri L. Bianchin
U.S. Environmental Protection Agency - Region V
Waste Management Division, HSRW-6J
77 West Jackson Boulevard
Chicago, Illinois 60604

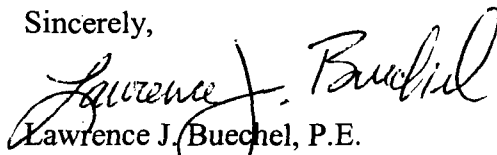
**RE: Muskego Sanitary Landfill Site
Groundwater Operable Unit
Quarterly Progress Report
February 2003 through April 2003**

Dear Ms. Bianchin:

Please find enclosed four copies of the Muskego Landfill Groundwater Operable Unit quarterly progress report for the period February through April 2003. This report has been prepared in accordance with Section XII, Paragraph 60 of the Unilateral Administrative Order for Remedial Design and Remedial Action - **Groundwater Operable Unit**, [U.S. EPA Docket Number V-W-95-C-29], and Task IV A. of the referenced Scope of Work, and the October 1997 Final Operation & Maintenance Plan.

If you have any questions, please do not hesitate to contact me at [262] 253-8626 – Ext. 123.

Sincerely,


Lawrence J. Buechel, P.E.
Project Coordinator

Enclosures

cc: Jim Delwiche, WDNR-SED [2 copies]
Muskego Site Groundwater Remediation Group Steering Committee

QUARTERLY PROGRESS STATUS REPORT
February 2003 through April 2003

SITE NAME/ACTIVITY

Muskego Sanitary Landfill
Groundwater Operable Unit (GWOU)
Muskego, Wisconsin

PREPARED BY:

Mr. Lawrence Buechel
Project Coordinator
Muskego Site Groundwater Remediation Group (MSGRG)
N96 W13600 County Line Road
Germantown, WI 53022
[414] 253-8626 – Ext. 123

DATE:

May 15, 2002

PERIODS:

February 2003 through April 2003

PERTINENT DATES RELATED TO IMPLEMENTATION OF THE UAO:

- | | | |
|---|---|-----------------|
| ◆ | - Signature Date of UAO: | June 6, 1995 |
| | - Effective Date of UAO: | June 26, 1995 |
| | - Draft RD/RA Work Plans Submitted
to U.S. EPA/WDNR [Agencies]: | July 21, 1995 |
| | - Draft RD/RA Work Plan Review
Comments issued by Agencies: | August 31, 1995 |
| | - Final RD/RA Work Plan submitted
to Agencies | October 5, 1995 |
| | - Pre-Design/Pilot Study Field Activities
started | August 21, 1996 |
| | - Preliminary (35%) Remedial Design -
Report Submitted to U.S. EPA
for review | May 6, 1997 |

PERTINENT DATES RELATED TO IMPLEMENTATION OF THE UAO: (Cont'd)

- Preliminary (35%) Remedial Design - Comments issued by USEPA	May	16, 1997
- Intermediate (65%) Remedial Design - Meeting held with Agencies	June	25, 1997
- Pre-Final (95%) Remedial Design Report submitted to U.S. EPA for review	July	30, 1997
- Pre-Final (95%) Remedial Design - Meeting held with Agencies	August	7, 1997
- Pre-Final (95%) Remedial Design - Comments issued by U.S. EPA	September	2, 1997
- Pre-Final (95%) Remedial Design - Response to comments issued by MLOG	September	25, 1997
- Conditional Approval of Final Remedial Design	September	26, 1997
- Final (100%) Remedial Design Report submitted to U.S. EPA	October	14, 1997
- GWOU RA Construction Completion Report submitted to U.S. EPA	December	4, 1997
- GWOU RA Construction Completion Report comment letter issued by U.S. EPA	February	2, 1998
- GWOU Final RA Construction Completion Report submitted to U.S. EPA	March	5, 1998
- Conditional Approval of GWOU Final RA Construction Documentation Report issued by U.S. EPA	April	13, 1998

QUARTERLY ACTIVITIES:

- ◆ Operation and maintenance of the groundwater extraction system at the Site continued during the months of February 2003 through April 2003. The system generally operated well during the quarter. Approximately 82,000 gallons, 916,000 gallons and 1,551,000 gallons were removed from extraction wells EW-1, EW-2, and EW-3R, respectively, during this period. Reduced flows from EW-1 continued during this quarter, as a result of the well frequently pumping dry.

QUARTERLY ACTIVITIES – Cont'd

- ◆ Groundwater extraction well EW-2 was found not to be pumping on April 29, 2003, while routine meter readings were being made. The well was observed to be operational during a site visit the prior week. Attempts to restart the extraction well pump were unsuccessful. An O&M contractor used at the site was contacted to trouble shoot and repair this situation. The well will be placed back into service following any repair.
- ◆ Inspection of the groundwater extraction system for the February 2003 – April 2003 reporting period was performed April 22, 2003. The system was generally found to be in good operating conduction during that inspection.
- ◆ Environmental monitoring activities at the site for the February 2003 – April 2003 reporting period were performed between April 9 and 28, 2003. Samples from this event have been submitted to Severn Trent Laboratory for analysis. Analytical results for the event will be submitted to the regulatory agencies following their receipt from the laboratory.
- ◆ Analytical results for the November 2002 – January 2003 environmental monitoring event were submitted to the regulatory agencies on March 19, 2003.

AGENCY APPROVALS, CORRESPONDENCE, CLARIFICATIONS:

- ◆ None

DOCUMENTS SUBMITTED:

- ◆ The Quarterly Progress Report for the period November 2002 through January 2003 was submitted on February 17, 2003.

TRAVEL/MEETINGS:

- ◆ None

AGENCY REVIEWS/APPROVALS PENDING:

- ◆ None

PERTINENT CONTACTS:

- ◆ None

PROBLEMS OR POTENTIAL PROBLEMS, AND ACTIONS:

- ◆ None

PERSONNEL CHANGES:

- ◆ None

UPCOMING ACTIVITIES PLANNED:

- ◆ Continued operation and maintenance of the groundwater extraction system, including extraction wells and discharge piping network. Any adjustments/repairs to extraction well EW-2 found to be necessary after it is troubleshot, will be made, and the well placed back into service.
- ◆ Evaluation of overall groundwater extraction system performance.
- ◆ Completion of laboratory analysis for the April 2003 environmental sampling event, and submittal of this data to regulatory agencies.
- ◆ The next environmental monitoring event for the site is scheduled for July 2003.

DATA TRANSMITTED WITH THIS REPORT:

- ◆ Groundwater Extraction/Treatment System Inspection Log – 04/22/03.

SCHEDULE:

- ◆ Site activities associated with the groundwater extraction system are being carried out in accordance with the schedules contained in either the Operation and Maintenance Plan or the Sampling and Analysis Plan approved for the facility.

Inspection Log Groundwater Extraction/Treatment System

Muskego Sanitary Landfill

Date: APRIL 22, 2003

Inspector: LARRY BUECHTEL

System Component	Observation		Comment/Action
	Yes	No	
Extraction Wells			
Vault secure	✓		
Well heads intact/valves operating	✓		
Flowmeter operating	✓		
Flow meter functional			
EW-1 total volume (note)	✓		637461
EW-2 total volume (note)	✓		604926
EW-3R total volume (note)	✓		16475749
Control panel intact	✓		
Treatment System			N/A
Building closed/locked			
Equalization tank intact			
Water feed pump operating			
Air stripper blower operating			
Control panel status lights "ok"			
Check stripping trays for fouling			
Replace stripping trays			N/A
Outfall			
Structure intact and free of obstructions	✓		
General Comments: <u>SYSTEM NOT TESTED WINTER WELL</u> <i>YB</i>			

**Muskego Sanitary Landfill
Committee Correspondence
Address Writer at
N96 W13600 County Line Road
Germantown, WI 53022**

May 15, 2003

Ms. Sheri L. Bianchin
U.S. Environmental Protection Agency [U.S. EPA] - Region V
Waste Management Division, HSRW-6J
77 West Jackson Boulevard
Chicago, Illinois 60604

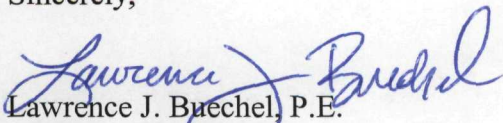
**RE: Muskego Sanitary Landfill Site
Source Control Operable Unit
Semi-Annual Progress Report
November 2002 through April 2003**

Dear Ms. Bianchin:

In accordance with Section XV, Paragraph 60 of the Unilateral Administrative Order for Remedial Design and Remedial Action, **Source Control Operable Unit**, [U.S. EPA Docket Number V-W-92-C-173], and Task IV A. of the referenced Scope of Work, please find enclosed four copies of the Semi-Annual Progress Report for the period November 2002 through April 2003.

If you have any questions, please do not hesitate to contact me at [262] 253-8626, ext 123.

Sincerely,


Lawrence J. Buechel, P.E.
Project Coordinator

Enclosures

cc: Jim Delwiche, WDNR
Muskego Steering Committee

**COMMITTEE CORRESPONDENCE
ADDRESS WRITER AT LOCATION BELOW**

SEMI-ANNUAL STATUS REPORT

SITE NAME/ACTIVITY

Muskego Sanitary Landfill
Source Control Operable Unit
Muskego, Wisconsin

PREPARED BY:

Mr. Lawrence Buechel
Project Coordinator
Muskego Site Remediation Group (MSRG)
N96 W13600 County Line Road
Germantown, Wisconsin 53022
[262] 253-8626 – Ext. 123

DATE:

May 15, 2003

PERIOD:

November 2002 through April 2003

PERTINENT DATES RELATED TO IMPLEMENTATION OF THE UAO:

- ◆ This submittal of a progress/status report is made pursuant to Paragraph 60 of the Unilateral Administrative Order [UAO] and Task IV of the referenced Scope of Work [SOW]. Pertinent dates related to implementation of the UAO include:

Signature Date of UAO:	December 9, 1992
Effective Date of UAO:	December 29, 1992
Draft RD/RA Work Plans Submitted to U.S. EPA/WDNR [Agencies]:	January 22, 1993
Date of Draft RD/RA Work Plan Agency Comments * :	February 24, 1993
Final RD/RA Work Plans [Volumes 1, 2 and 4] Submitted to Agencies:	March 26, 1993

Date of Final RD/RA Work Plans*		
Conditional Approval by Agencies:	May	20, 1993
Preliminary Design Package		
Submitted to Agencies:	June	21, 1993
Final QAPP [Volume 3 of the RD/RA		
Work Plans] submitted to Agencies:	June	21, 1993
Final Design Package submitted to Agencies:	September	18, 1993
U.S. EPA Approval of Final Design Package		
[Except for Interim Groundwater Monitoring		
Program]	October	7, 1993
Pre-Construction Meeting	October	18, 1993
Construction Phase Initiated	October	18, 1993
RA Field Modification No. 1	October	21, 1993
(October 19, 1993)	October	28, 1993
Addendum No. 1 to the Final Design Package	October	22, 1993
Test Pits to Verify the Lateral Limits of Waste	November	2-4, 1993
Installation of Phase 1 Dual Extraction		
[landfill gas/leachate] Wells completed	November	9, 1993
Meeting to Discuss the Interim Groundwater		
Monitoring Program [IGMP]	November	9, 1993
Field Modification #2	January	5, 1994
Field Modification #3	January	10, 1994
Installation of Phase IA dual extraction		
wells completed	January	28, 1994
The underground storage tank discovered		
during excavation of the East Sedimentation		
Basin [<i>former Rendering Company property</i>]		
was cleaned and removed for off-site destruction	February	11, 1994
Dual extraction collection header and lateral		
construction/pressure testing completed	February	28, 1994
Site grading/East Sedimentation Basin		
construction completed	February,	1994
Gas collection trench in the L-Shaped Fill Area		
completed	April	26, 1994
Groundwater monitoring wells E140 and		
E141A installed April 18-19, 1994 and		
subsequently developed	April	27, 1994
The first round of groundwater sampling under		
the approved Interim Groundwater		
Monitoring Plan was completed	April	28, 1994
Installation and development of groundwater		
monitoring well E141B was completed	May	3, 1994
Phase II well abandonment completed	May	18, 1994
Field Modification #4	June	22, 1994

Preparation grading of the Old Fill and Southeast Fill Area was completed.	July,	1994
Seeding of the completed cap areas, west sedimentation basin and perimeter ditches is completed.	August,	1994
Construction of perimeter ditches and roadways was completed.	August,	1994
Construction of the compressor building and blower/flare station is completed.	September,	1994
Field Modification #5 & #6	September 19,	1994
Construction Completion Report submitted to U.S. EPA and WDNR for review	December 4,	1995
Approval of the Construction Completion Report by U.S. EPA and WDNR	July 8,	1996
Draft ISVE Pilot Scale Test Report submitted to U.S. EPA and WDNR for review	June 22,	1998
Comment letter on draft ISVE Pilot Scale Test Report issued by U.S. EPA	February 25,	1999

* Volume 1, 2, and 4 only; Agency review [comments] on the Draft Quality Assurance Report Plan [QAPP - Volume 3] were received on March 29, 1993 [dated March 9, 1993].

PROGRESS MADE DURING THIS PERIOD:

- ◆ Operation and maintenance of site's leachate and landfill gas management system continued. Systems generally continue to perform well. Approximately 228,000 gallons of leachate were removed from the site during this six-month period. In addition, monthly monitoring of the landfill gas system indicates an average of approximately 213 cubic feet per minute of landfill gas (at 32 % methane) were withdrawn from the site by the landfill gas control system during this reporting period. See the attached table summarizing this gas and leachate information.
- ◆ QED Environmental Systems performed routine inspection and maintenance of the pneumatic leachate pumps and controls for the site's dual extraction system on November 19, 2002. The pumps and controls were generally found to be in good operating condition. Pumps and discharge hosing were cleaned and any non-functioning or broken components were replaced.

- ◆ Draft responses to USEPA comments on the Pilot Scale ISVE Test Report were submitted to USEPA and WDNR for review on November 15, 2002. Following completion of USEPA review of the draft Pilot Scale ISVE Test Report comment responses, a meeting between MSRG and USEPA will be held to discuss the responses-to-comments and finalization of that Report.

AGENCY APPROVALS, CORRESPONDENCE, CLARIFICATIONS:

- ◆ None.

DOCUMENTS SUBMITTED:

- ◆ The Semi-Annual Progress Report for the period May 2002 through October 2002 was submitted on November 15, 2002.

AGENCY REVIEWS/APPROVALS PENDING:

- ◆ Review of draft responses to USEPA comments on the Pilot-scale ISVE Test Report.

PERTINENT CONTACTS:

- ◆ None

PROBLEMS OR POTENTIAL PROBLEMS, AND ACTIONS:

- ◆ None

PERSONNEL CHANGES:

- ◆ None

UPCOMING ACTIVITIES PLANNED:

- ◆ Routine inspection and maintenance of the pneumatic leachate pumps and controls in the Site's dual extraction wells is planned for May 2003, and August 2003. Any necessary adjustments or repairs will be made to the pumps and controls at that time to address any system issues.
- ◆ Regrading of settlement areas in the southwest portion of the site is planned for completion during the upcoming reporting period. Survey work is underway to determine the limits of this regrading work. In addition, landfill gas header piping in this portion of the site may also need to be re-aligned as a results of this settlement to re-establish slope on the header pipe. This work would be completed in conjunction with the above-referenced regrading work.
- ◆ Continued operation, monitoring and tuning of the landfill gas extraction system.
- ◆ Continued operation, monitoring and adjustment of the leachate collection system.

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Muskego Landfill
Landfill Gas and Leachate Extraction Volume Summary
November 2002 - April 2003

Month	Leachate Volume Removed (gals)	LFG Flow Rate (cfm)	Methane Concentration (%)
November, 2002	50,400	168	47
December, 2002	37,400	275	22
January, 2003	46,700	281	28
February, 2003	41,400	196	24
March, 2003	31,800	182	36
April, 2003	20,200	177	37

Total Gallons	227,900
---------------	---------

Monthly Average	213	32
-----------------	-----	----

**Muskego Site Groundwater Remediation Group
Committee Correspondence
Address Writer at
N96 W13600 County Line Road
Germantown, WI 53022**

August 16, 2004

Ms. Sheri L. Bianchin
U.S. Environmental Protection Agency - Region V
Waste Management Division, HSRW-6J
77 West Jackson Boulevard
Chicago, Illinois 60604

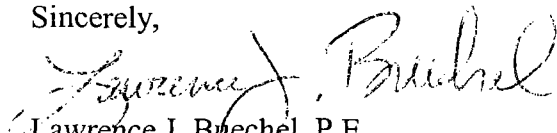
**RE: Muskego Sanitary Landfill Site
Groundwater Operable Unit
Quarterly Progress Report
May 2004 through July 2004**

Dear Ms. Bianchin:

Please find enclosed four copies of the Muskego Landfill Groundwater Operable Unit quarterly progress report for the period May 2004 through July 2004. This report has been prepared in accordance with Section XII, Paragraph 60 of the Unilateral Administrative Order for Remedial Design and Remedial Action - **Groundwater Operable Unit**, [U.S. EPA Docket Number V-W-95-C-29], and Task IV A. of the referenced Scope of Work, and the October 1997 Final Operation & Maintenance Plan.

If you have any questions, please do not hesitate to contact me at [262] 253-8626 – Ext. 123.

Sincerely,


Lawrence J. Buechel, P.E.
Project Coordinator

Enclosures

cc: Jim Delwiche, WDNR-SED [2 copies]
Muskego Site Groundwater Remediation Group Steering Committee

QUARTERLY PROGRESS STATUS REPORT
May 2004 through July 2004

SITE NAME/ACTIVITY

Muskego Sanitary Landfill
Groundwater Operable Unit (GWOU)
Muskego, Wisconsin

PREPARED BY:

Mr. Lawrence Buechel
Project Coordinator
Muskego Site Groundwater Remediation Group (MSGRG)
N96 W13600 County Line Road
Germantown, WI 53022
[262] 253-8626 – Ext. 123

DATE:

August 16, 2004

PERIODS:

May 2004 through July 2004

PERTINENT DATES RELATED TO IMPLEMENTATION OF THE UAO:

- | | | |
|---|---|-----------------|
| ◆ | - Signature Date of UAO: | June 6, 1995 |
| | - Effective Date of UAO: | June 26, 1995 |
| | - Draft RD/RA Work Plans Submitted
to U.S. EPA/WDNR [Agencies]: | July 21, 1995 |
| | - Draft RD/RA Work Plan Review
Comments issued by Agencies: | August 31, 1995 |
| | - Final RD/RA Work Plan submitted
to Agencies | October 5, 1995 |
| | - Pre-Design/Pilot Study Field Activities
started | August 21, 1996 |
| | - Preliminary (35%) Remedial Design -
Report Submitted to U.S. EPA
for review | May 6, 1997 |

PERTINENT DATES RELATED TO IMPLEMENTATION OF THE UAO: (Cont'd)

- Preliminary (35%) Remedial Design - Comments issued by USEPA	May 16, 1997
- Intermediate (65%) Remedial Design - Meeting held with Agencies	June 25, 1997
- Pre-Final (95%) Remedial Design Report submitted to U.S. EPA for review	July 30, 1997
- Pre-Final (95%) Remedial Design - Meeting held with Agencies	August 7, 1997
- Pre-Final (95%) Remedial Design - Comments issued by U.S. EPA	September 2, 1997
- Pre-Final (95%) Remedial Design - Response to comments issued by MLOG	September 25, 1997
- Conditional Approval of Final Remedial Design	September 26, 1997
- Final (100%) Remedial Design Report submitted to U.S. EPA	October 14, 1997
- GWOU RA Construction Completion Report submitted to U.S. EPA	December 4, 1997
- GWOU RA Construction Completion Report comment letter issued by U.S. EPA	February 2, 1998
- GWOU Final RA Construction Completion Report submitted to U.S. EPA	March 5, 1998
- Conditional Approval of GWOU Final RA Construction Documentation Report issued by U.S. EPA	April 13, 1998

QUARTERLY ACTIVITIES:

- ◆ Operation and maintenance of the groundwater extraction system at the Site continued during the months of May 2004 through July 2004. The system generally operated well during the quarter. Approximately 545,000 gallons, 901,000 gallons and 1,591,000 gallons were removed from extraction wells EW-1, EW-2, and EW-3R, respectively, during this period. Flow volumes generally increased during this quarter, most likely attributable to more continuous operation of the well network and higher-than-normal precipitation during late May and June.

QUARTERLY ACTIVITIES – Cont'd

- ◆ On May 19, 2004, the flow meter, pump and discharge piping at extraction well EW-1 were disassembled, removed, and cleaned to remove accumulated iron bacteria that was adversely affecting the performance of the well components. It is believed the routine draw down of the water level in this extraction well leads to the precipitation of more iron bacteria in the well and pumping system, which in turn fouls the meter, pump and piping. Following completion of this work, the well was returned to service and remained functional throughout the remainder of the quarter.
- ◆ On July 14, 2004, the flow meter in extraction well EW-2 was disassembled, removed, and cleaned to clear accumulated iron bacteria that were affecting its performance. Following completion of this work, the well was returned to service.
- ◆ Inspection of the groundwater extraction system for this reporting period was performed June 8, 2004. The system was generally found to be in good operating conduction during that inspection.
- ◆ Environmental monitoring activities at the site for this reporting period were performed between July 13 and 21, 2004. Samples from this event have been submitted to Severn Trent Laboratory for analysis. Analytical results for the event will be submitted to the regulatory agencies following their receipt from the laboratory.
- ◆ Analytical results for the February 2004 – April 2004 environmental monitoring event were submitted to the regulatory agencies on May 28, 2004.

AGENCY APPROVALS, CORRESPONDENCE, CLARIFICATIONS:

- ◆ None

DOCUMENTS SUBMITTED

- ◆ The Quarterly Progress Report for the period February 2004 through April 2004 was submitted on May 17, 2004.

TRAVEL/MEETINGS:

- ◆ The USEPA Five-Year Review inspection of the Muskego Sanitary Landfill was performed on July 15, 2004. Representatives from USEPA, WDNR and MSGRG were present at the site for this inspection.

AGENCY REVIEWS/APPROVALS PENDING:

- ◆ Review of Groundwater Extraction System Performance Review Work Plan.

PERTINENT CONTACTS:

- ◆ None

PROBLEMS OR POTENTIAL PROBLEMS, AND ACTIONS:

- ◆ None

PERSONNEL CHANGES:

- ◆ None

UPCOMING ACTIVITIES PLANNED:

- ◆ Continued operation and maintenance of the groundwater extraction system, including extraction wells and discharge piping network.
- ◆ Evaluation of overall groundwater extraction system performance.
- ◆ Completion of laboratory analysis for the July 2004 environmental sampling event, and submittal of this data to regulatory agencies.
- ◆ The next environmental monitoring event for the site is scheduled for October 2004.

DATA TRANSMITTED WITH THIS REPORT:

- ◆ Groundwater Extraction/Treatment System Inspection Log – 6/8/04.

SCHEDULE:

- ◆ Site activities associated with the groundwater extraction system are being carried out in accordance with the schedules contained in either the Operation and Maintenance Plan or the Sampling and Analysis Plan approved for the facility.

c:\doc\larry.buechel\0809b.doc

Inspection Log Groundwater Extraction/Treatment System

Muskego Sanitary Landfill

Date: JUNE 8, 2001
Inspector: LARRY BRECHER

System Component	Observation		Comment/Action
	Yes	No	
Extraction Wells			
Vault secure	✓		
Well heads intact/valves operating	✓		
Flowmeter operating	✓		
Flow meter functional	✓		
EW-1 total volume (note)	✓		526,814 gals
EW-2 total volume (note)	✓		270,162 gals
EW-3R total volume (note)	✓		20,722,985 gals
Control panel intact	✓		
Treatment System			
Building closed/locked			N/A
Equalization tank intact			
Water feed pump operating			
Air stripper blower operating			
Control panel status lights "ok"			
Check stripping trays for fouling			
Replace stripping trays			N/A
Outfall			
Structure intact and free of obstructions	✓		
General Comments: EW-1 checked - Valve stuck closed. No air flow. No water flow. All system components appear to be in good working order.			

MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report

EXHIBIT 12

**U.S. EPA LETTER REQUIRING PRPs TO SUBMIT
ELECTRONIC DATA**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

SR-6J

VIA E-mail and
CERTIFIED MAIL

Mr. Lawrence J. Buechel
Project Manager
Waste Management
W124 N9355 Boundary Road
Menominee Falls, WI 53051

Re: Submittal of Electronic Data
Muskego Landfill Superfund Site
Muskego, WI
Civil Action No. V-W-92-C-173 and V-W-95-C-29

Dear Mr. Buechel:

Pursuant to Unilateral Administrative Order ("UAO") No. V-W-92-C-173, and UAO No. V-W-95-C-29, and as required under Section 121 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. §9621, no less often than every five years, EPA is required to review remedial actions where hazardous substances, pollutants or contaminants remain in place at Superfund sites to assure that human health and the environment continue to be protected. [See Section XI, EPA Periodic Review, in UAO No. V-W-92-C-173, and UAO No. V-W-95-C-29]. In anticipation of the five year reviews that will be completed for the Muskego site in the future, EPA hereby requires that the Defendants submit electronic copies of site information and site geology and chemistry data to EPA Region 5 according to the schedule and specifications discussed in this letter.

SPECIFICATIONS

Overviews of the requirements for electronic data submittal are outlined in the enclosed "Quick Reference Guide" and "Superfund E-Data Update: February 2003." The EPA Region 5 "Electronic Data Deliverable (EDD) Specification Manual" and the EPA Region 5 "EDD Historical Data Manual," however, contain complete descriptions of data formatting requirements. You may access these documents at the following web site:

<http://www.epa.gov/region5superfund/edman>

SR-6J

VIA E-mail and
CERTIFIED MAIL

Mr. Lawrence J. Buechel
Project Manager
Waste Management
W124 N9355 Boundary Road
Menominee Falls, WI 53051

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Muskego, WI
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For all operation and maintenance (O&M) data, Defendants must use the requirements in the EDD Specification Manual. In addition, these same specifications should be used for all data collected one year or less prior to the date this letter is received and for all data collected from this date forward. For “non-O&M”¹ data acquired more than one year before the receipt of this letter and for which sufficient information is not available to comply with the full requirements in the EDD Specification Manual, Defendants may use the EDD Historical Data Manual formatting requirements.

If data are currently stored in a database or in spreadsheets, submitting an EDD in the EPA format will entail developing an export to transfer the data into EPA’s format and inputting data into any fields that are not populated.

SITE AND LOCATION EDD FILES

Defendants must submit the initial Site and EDD Location files with the information identified in the EDD Specification Manual to EPA **within thirty (30) days of receipt** of this letter. Required information in the Site and Location EDD files include general information about the site, such as the main point of contact for the EDD files, a site base map, site monitoring well coordinates and elevations, and information about measurement accuracy. Please note that when any information changes, a revised Site and/or Location file will need to be resubmitted. For example, each time a new sampling location is used (e.g., when a new groundwater monitoring well is installed), the Location file will have to be resubmitted with the new information. Resubmitted EDD files should be prepared according to the specifications in the EDD Specification Manual (not the EDD Historical Data Manual).

GEOLOGY EDD FILES

Defendants must submit Geology EDD files with the information identified in the EDD Specification Manual for all geology data collected during the past year and all data related to O&M activities. The types of information required in the Geology EDD files include drilling activities, lithology, geologic sampling, down hole point data, groundwater levels, and construction details of monitoring wells and/or piezometers that have been or are being installed and are monitored as part of O&M requirements. Defendants must also submit Geology EDD files for all non-O&M geology data collected more than one year prior to the receipt of this letter. Defendants may use the EDD Historical Data Manual formatting requirements for this “historical data” if such data were acquired more than one year before the date of this letter and if the Defendants do not have sufficient information for this data to comply with the requirements in the EDD Specification Manual.

Defendants must submit the Geology EDD files **within sixty (60) days** of receipt of this letter.

CHEMISTRY EDD FILES

Defendants must submit Chemistry EDD files with the information identified in the EDD Specification Manual for all O&M chemistry data and all chemistry data collected. Defendants may use the EDD Historical Data Manual formatting requirements for this historical data, if sufficient information is not

¹ “Non-O&M” data refers to chemistry and geology data collected as part of the Site remedial investigation/feasibility study (RI/FS), remedial design (RD), remedial action (RA), or during other data collection activities related to the Site.

available to comply with the requirements in the EDD Specification Manual. The types of information required in Chemistry EDD files include field measurements, chemistry tests and results, and water level measurements.

Defendants must submit the Chemistry EDD files **within sixty (60) days** of receipt of this letter.

FUTURE DATA

Beginning from the date of receipt of this letter, EPA Region 5 requires electronic data submittal, in addition to paper copies, of all geological and chemistry data collected for the Site according to the specifications in the EDD Specification Manual and according to the schedule in the Consent Decree, Statement of Work, and approved Work Plan(s). Requirements for hard copy reports will be evaluated and revised after the new electronic data protocol is fully established.

DATA CHECKING SOFTWARE AND ERROR MESSAGES

The EPA web site provided on the first page of this letter also contains two downloadable software applications – the Electronic Lab Data Checker (ELDC) and the Electronic Field Data Checker (EFDC)-- that need to be used to check your EDD files prior to submittal. EPA has already purchased the software, and both applications may be downloaded to check EDD data files submitted to EPA Region 5. The software vendor has requested that a brief registration form containing general information about the user be submitted prior to downloading; however, there will be no charge to the user.

In using the ELDC and EFDC software to check your EDD files, it is likely that you will receive some error messages. Some of these messages will be due to using a value or data entry not yet included in EPA Region 5's list of Valid Values (also found on the web site provided earlier). The cover letter that accompanies your EDD should document all error messages you received that you weren't able to fix.

CONTACT INFORMATION

Please send the EDD files to:

Superfund E-Data Coordinator
U.S. EPA (S-6J)
77 W. Jackson Blvd.
Chicago, IL 60604

COVER LETTER

In addition to sending a cover letter and the EDD to the contact shown above, please send me a copy of the cover letter only. Cover letters should document all errors identified that you were not able to correct and should provide explanations for any "required" data fields which were left blank. **Also, please include an electronic copy of the cover letter on the EDD diskette or CD (compact disk).**

If you would find it helpful, a conference call to discuss the electronic data protocol can be arranged. If you have any questions at any time, or would like to set up a conference call, please contact one of the staff listed below.

Doug Zamastil	(312) 886-0650	zamastil.doug@epa.gov
Dave Wilson	(312) 886-1476	wilson.david@epa.gov
Mary Tierney	(312) 886-4785	tierney.mary@epa.gov

We look forward to working with you on this step toward making the exchange of environmental data more efficient and accurate.

Sincerely,

Sheri L. Bianchin,
Remedial Project Manager
Superfund Division

cc: Mr. James C. Delewiche, WDNR
Ms. Sharon Shaver, WDNR
Ms. Nancy Payne, WDNR
Henry Nehls-Lowe, WDPH
Bob Kay, U.S.G.S.

bcc: Sheri Bianchin, U.S. EPA, SD
Thomas Krueger, U.S. EPA, ORC
Heather Borland, Booz-Allen-Hamilton

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We look forward to working with you on this step toward making the exchange of environmental data more efficient and accurate.

Sincerely,

/original signed by Sheri Bianchin/

Sheri L. Bianchin,
Remedial Project Manager
Superfund Division

cc: Mr. James C. Delewiche, WDNR
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Bob Kay, U.S.G.S.

bcc:

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 13

**RESULTS OF VOC MONITORING AT
PRIVATE WELLS**

TABLE 5

Page 1 of 1

**Summary of Detections
Muskego Municipal Well # 7
Muskego Sanitary Landfill**

Description	Units	6/25/97	8/12/98	3/8/99	2/22/00	9/20/00	10/30/01	3/11/02	MCL	MCL Units
ALKALINITY, TOTAL	MG/L	310		314			307			MG/L
ALUMINUM	UG/L			52						MG/L
ARSENIC	MG/L	0.011							0.05	MG/L
ARSENIC	UG/L			4.6		4.1		5	0.05	MG/L
BARIUM	MG/L	0.11							2	MG/L
BARIUM	UG/L			97			100	98	2	MG/L
CALCIUM	MG/L	58		64			75.1			MG/L
CHLORIDE	MG/L	4.2		6.7			8.6			MG/L
CHROMIUM	MG/L	0.006							0.1	MG/L
CONDUCTIVITY @ 25 C U-MHO	UMHOS/CM			622			672			
COPPER	UG/L	0.0026								UG/L
FLUORIDE	MG/L	0.6		0.53			0.38	0.42	4	MG/L
GROSS ALPHA, EXCL. R & U	PCI/L	1.9						1	15	PCI/L
GROSS BETA PARTICLE ACTIVITY	PCI/L	1.8						0.9	50	PCI/L
HARDNESS, TOTAL (CAC03)	MG/L	320		330			374			MG/L
IRON	MG/L	0.25		0.6			0.8			MG/L
LEAD	UG/L	0.0026								UG/L
MAGNESIUM	MG/L	43		41			45.3			MG/L
MANGANESE	MG/L	0.054								MG/L
MANGANESE	UG/L			38			39			MG/L
NICKEL	MG/L	0.0083							0.1	MG/L
NICKEL	UG/L			10					0.1	MG/L
NITRATE (N03-N)	MG/L			0.12					10	MG/L
NITRATE-NITRITE (N03+N02)	MG/L			0.12	0.1				10	MG/L
PH	SU	7.5		7.78			7.97			
RADIUM, (226 + 228)	PCI/L							1.26	5	PCI/L
RADIUM-226	PCI/L							0.26	5	PCI/L
RADIUM-228	PCI/L							1	5	PCI/L
RADON	PCI/L	100								
RESIDUE, TOT, FILT	MG/L	340		402						MG/L
RESIDUE, TOTAL	MG/L						400			MG/L
SODIUM	MG/L	9.3	6.3	5.9			5.6	5.6		MG/L
SULFATE	MG/L	24					49.5			MG/L

Notes:

1. Data obtained from the Wisconsin Department of Natural Resources Public Water Supply Systems Database.
2. Only results greater than the detection limit are listed. VOCs were also sampled but not detected therefore compounds are not listed on this table.

Table 4
Summary of Private Well Analytical Data - VOCs
 Expanded Groundwater Monitoring Work Plan
 Muskego Sanitary Landfill
 Muskego, Wisconsin

Sample Description	Sample Date	Concentration (ug/L)												
		1,4-Dichlorobenzene	Acetone	Bromoform	Chloro- benzene	Chloro- methane	cis-1,2- Dichloroethene	Dibromo- chloromethane	Dichloro- difluoromethane	Methylene Chloride	Tetrachlor- ethene	Toluene	Trans-1,2- Dichloroethene	Vinyl Chloride
MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
POST RI SAMPLING														
ANTHONY VITRANO	07/02/97	< 10	< 34	< 5	< 5	< 10	< 10	< 5	< 10	< 5	< 1.82	< 5	< 10	2
ANTHONY VITRANO	10/02/97	< 0.2	< 5.0	< 0.2	< 0.2	< 0.4	< 0.3	< 0.1	< 0.3	< 0.3	< 0.3	< 0.2	< 0.3	2
ANTHONY VITRANO	01/14/98	< 0.2	< 5.0	< 0.2	< 0.2	< 0.3	< 0.2	< 0.1	< 0.3	< 0.2	< 0.3	< 0.2	< 0.2	2
ANTHONY VITRANO DUP	01/14/98	< 0.2	< 5.0	< 0.2	< 0.2	< 0.3	< 0.2	< 0.1	< 0.3	< 0.2	< 0.3	< 0.2	< 0.2	2.3
ANTHONY VITRANO ¹⁴	05/26/99	NR	NR	NR	NR	< 0.60	< 0.50	NR	NR	NR	< 0.50	0.63	< 0.50	2.1
ANTHONY VITRANO ¹⁴	08/26/02	NR	NR	NR	NR	< 0.600	< 0.500	NR	NR	NR	< 0.500	< 0.500	< 0.500	0.838
ACKER	03/17/98	0.2 J	< 34	< 5	< 5	< 10	< 10	< 5	0.7 J	< 5	< 1.82	< 5	< 10	< 1.85
BEILFUSS	01/20/99	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
CAMPBELL	01/20/99	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
DYER BARN	03/17/98	< 10	< 34	< 5	< 5	< 10	< 10	< 5	< 10	< 5	< 1.82	< 5	< 10	1.0 J
DYER BARN	12/01/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	1.2
DYER BARN ¹⁴	05/26/99	NR	NR	NR	NR	< 0.60	< 0.50	NR	NR	NR	< 0.50	< 0.50	< 0.50	1.9
DYER BARN ¹⁴	02/08/00	NR	NR	NR	NR	< 0.60	< 0.50	NR	NR	NR	< 0.50	< 0.50	< 0.50	1.9
DYER BARN ¹⁴	02/04/01	NR	NR	NR	NR	< 0.500	< 0.500	NR	NR	NR	< 0.500	< 0.500	< 0.500	1.11
DYER HOUSE	03/17/98	< 10	< 34	< 5	< 5	< 10	2.0 J	< 5	< 10	< 5	< 1.82	< 5	< 10	1.0 J
DYER HOUSE	12/01/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	1.8	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	1.1
DYER HOUSE	12/01/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	1.8	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	1.1
DYER HOUSE ¹⁴	05/26/99	NR	NR	NR	NR	< 0.60	2.7	NR	NR	NR	< 0.50	< 0.50	< 0.50	2.9
DYER HOUSE ¹⁴	02/08/00	NR	NR	NR	NR	< 0.60	2.7	NR	NR	NR	< 0.50	< 0.50	< 0.50	1.0
DYER HOUSE ¹⁴	02/04/01	NR	NR	NR	NR	< 0.500	2.14	NR	NR	NR	< 0.500	< 0.500	< 0.500	1.48
DYER HOUSE ¹⁴	08/26/02	NR	NR	NR	NR	< 0.600	0.658	NR	NR	NR	< 0.500	< 0.500	< 0.500	0.548
FEINAUER	03/17/98	< 10	< 34	< 5	< 5	< 10	< 10	< 5	< 10	< 5	< 1.82	< 5	< 10	< 1.85
FEINAUER	12/01/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
FEINAUER	12/21/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
FEINAUER	07/21/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
FEINAUER DUP	07/21/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3

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MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
PRE-RI/RI SAMPLING EVENTS														
PW-1	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	14	< 10
PW-2	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-5 ¹³	10/04/82	--	--	--	--	--	< 10	--	--	--	< 10	--	< 10	--
PW-6	07/16/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-6	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-8	01/30/91	< 0.5	--	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PW-8	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-9	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-9	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-10	05/03/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0
PW-10	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-11	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-12	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-12	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-12	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-14	01/30/91	< 0.5	--	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PW-15	01/31/91	< 0.5	--	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PW-22	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-D	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-D	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-E	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-E	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-F	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-F	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-G	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-G	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PWM	01/30/91	< 0.5	--	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PETERS (PW26)	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PETERS (PW26)	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
A. VITRANO	07/17/84	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

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MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
FISCHER	10/02/97	< 0.2	< 5.0	< 0.2	< 0.2	< 0.4	< 0.3	< 0.1	< 0.3	< 0.3	< 0.3	< 0.2	< 0.3	< 0.3
FISCHER ¹⁴	06/18/99	NR	NR	NR	NR	< 0.60	< 0.50	NR	NR	NR	< 0.50	< 0.50	< 0.50	< 0.17
FISCHER	07/14/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
FISCHER	07/21/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
FISCHER	02/02/00	< 0.1	< 8.1	--	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
FISCHER	05/30/00	< 0.1	< 8.1	< 0.2	< 0.1	0.28 J	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
FISCHER	06/27/01	< 0.1	< 8.1	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
FISCHER DUP	06/27/01	< 0.1	< 8.1	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
FISCHER	11/26/01	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
FISCHER DUP	11/26/01	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
FISCHER	07/17/02	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
FISCHER ¹⁴	08/26/02	NR	NR	NR	NR	< 0.600	< 0.500	NR	NR	NR	< 0.500	< 0.500	< 0.500	< 0.170
FISCHER	11/11/02	< 0.33	< 4.8	< 0.40	< 0.20	< 0.35	< 0.19	< 0.31	< 0.21	< 0.69	< 0.34	< 0.29	< 0.25	< 0.22
FISCHER DUP	11/11/02	< 0.33	< 4.8	< 0.40	< 0.20	< 0.35	< 0.19	< 0.31	< 0.21	< 0.69	< 0.34	< 0.29	< 0.27	< 0.22
GROSS	05/10/01	< 0.1	--	< 0.2	< 0.1	0.39 U	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.4	< 0.1
GUMIENY	01/20/99	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.4	< 0.3
KNUTSON	07/21/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
KRABbenhOFT	05/10/01	< 0.1	--	< 0.2	< 0.1	0.38 U	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
KRABbenhOFT DUP	05/10/01	< 0.1	--	< 0.2	< 0.1	0.41 U	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
LOPPNOW	03/17/98													
LOPPNOW	12/01/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
LOPPNOW DUP	12/01/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
LOPPNOW	12/21/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
LOPPNOW	07/14/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
LOPPNOW	02/02/00	< 0.1	< 8.1	--	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
LOPPNOW ¹⁵	05/30/00	< 0.1	< 8.1	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	0.22 J
LOPPNOW	07/13/00	< 0.1	--	--	< 0.1	< 0.2	< 0.2	--	< 0.1	< 0.4	< 0.1	0.21 J	< 0.1	< 0.1

Table 4
Summary of Private Well Analytical Data - VOCs
Expanded Groundwater Monitoring Work Plan
Muskego Sanitary Landfill
Muskego, Wisconsin

Sample Description	Sample Date	Concentration (ug/L)												
		1,4-Dichlorobenzene	Acetone	Bromoform	Chloro- benzene	Chloro- methane	cis-1,2- Dichloroethene	Dibromo- chloromethane	Dichloro- difluoromethane	Methylene Chloride	Tetrachloro- ethene	Toluene	Trans-1,2- Dichloroethene	Vinyl Chloride
MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
MAGESKE (PW-M)	01/30/91	< 0.5	--	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
MAGESKE	07/02/97	< 10	< 34	< 5	< 5	< 10	< 10	< 5	< 10	< 5	< 1.82	< 5	< 10	< 1.85
MAGESKE	10/02/97	< 0.2	< 0.2	< 0.2	< 0.2	< 0.4	< 0.3	< 0.1	< 0.3	< 0.3	< 0.2	< 0.1	< 0.3	< 0.3
MAGESKE	03/08/01	< 0.1	< 8.1	< 0.2	< 0.1	0.21	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
MAGESKE	11/26/01	< 0.21	< 3.7	< 0.16	< 0.12	0.55 J	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
MAGESKE	07/17/02	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
MAGESKE (PW-M) ¹⁴	08/26/02	NR	NR	NR	NR	< 0.600	< 0.500	NR	NR	NR	< 0.500	< 0.500	< 0.500	0.493
MITSCH	01/20/99	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
PW22 ¹⁴	05/26/99	NR	NR	NR	NR	< 0.60	< 0.50	NR	NR	NR	< 0.50	< 0.50	< 0.50	1.4
PW22 ¹⁴	08/23/99	NR	NR	NR	NR	< 0.15	< 0.15	NR	NR	NR	< 0.15	< 0.15	< 0.15	1.8
PW22 ¹⁴	08/26/02	NR	NR	NR	NR	< 0.600	< 0.500	NR	NR	NR	< 0.500	< 0.500	< 0.500	3.02
MOODY	07/14/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
MOODY DUP	07/14/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
PET SUPPLIES	07/14/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
PET SUPPLIES	09/01/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	0.50 J
PRIES	01/20/99	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
PRIES	05/30/00	< 0.1	< 8.1	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
PRIES	06/27/01	< 0.1	< 8.1	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
PRIES	11/26/01	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
PRIES	07/17/02	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
PRIES	11/11/02	< 0.33	< 4.8	< 0.40	< 0.20	< 0.35	< 0.19	< 0.31	< 0.21	< 0.69	< 0.34	< 0.29	< 0.25	< 0.22
PRIES	12/04/03	< 0.040	< 1.6	< 0.030	< 0.030	0.073 J	< 0.040	< 0.030	< 0.040	< 0.030	< 0.040	< 0.030	< 0.050	< 0.010
PRIES DUP	12/04/03	< 0.040	< 1.6	< 0.030	< 0.030	< 0.050	< 0.040	< 0.030	< 0.040	< 0.030	< 0.040	< 0.030	< 0.050	< 0.010
SCHMIDT	03/08/01	< 0.1	< 8.1	< 0.2	< 0.1	0.23	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
SCHMIDT	11/26/01	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
SCHMIDT	07/17/02	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	0.58 J	< 0.5	< 0.8	< 0.15	0.35 J	< 0.4	< 0.18
SCHMIDT	11/11/02	< 0.33	< 4.8	< 0.40	< 0.20	< 0.35	< 0.19	< 0.31	< 0.21	< 0.69	< 0.34	< 0.29	< 0.25	< 0.22
SCHMIDT	12/04/03	< 0.040	< 1.6	< 0.030	< 0.030	< 0.050	< 0.040	< 0.030	< 0.040	< 0.030	< 0.040	< 0.030	< 0.050	< 0.010
SEYBOLD	07/21/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
SHANE	01/20/99	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
SHANE DUP	01/20/99	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
THEILE	07/02/97	< 10	< 34	< 5	< 5	< 10	< 10	< 5	< 10	< 5	< 1.82	< 5	< 10	1.0 J
THEILE	10/02/97	< 0.2	< 5.0	< 0.2	< 0.2	< 0.4	< 0.3	< 0.1	< 0.3	< 0.3	< 0.3	< 0.2	< 0.3	1.0 J
THEILE	01/14/98	< 0.2	< 5.0	< 0.2	< 0.2	< 0.3	< 0.2	< 0.1	< 0.3	< 0.2	< 0.3	< 0.2	< 0.2	1.0 J

Table 4
Summary of Private Well Analytical Data - VOCs
Expanded Groundwater Monitoring Work Plan
Muskego Sanitary Landfill
Muskego, Wisconsin

Sample Description	Sample Date	Concentration (ug/L)												
		1,4-Dichlorobenzene	Acetone	Bromoform	Chloro- benzene	Chloro- methane	cis-1,2- Dichloroethene	Dibromo- chloromethane	Dichloro- difluoromethane	Methylene Chloride	Tetrachloro- ethene	Toluene	Trans-1,2- Dichloroethene	Vinyl Chloride
MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
THOMAS VITRANO	03/17/98	< 10	< 34	< 5	< 5	< 10	0.40 J	< 5	< 10	< 5	< 1.82	< 5	< 10	2
THOMAS VITRANO	12/07/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	2.5
THOMAS VITRANO	12/21/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	2.4
THOMAS VITRANO DUP	12/21/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	0.50 J	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	1.7
THOMAS VITRANO	05/26/99	NR	NR	NR	NR	< 0.60	< 0.50	NR	NR	NR	< 0.50	< 0.50	< 0.50	1.1
THOMAS VITRANO	08/26/02	NR	NR	NR	NR	< 0.600	< 0.500	NR	NR	NR	< 0.500	1.24	< 0.500	< 0.170
TB	07/02/97	< 10	< 34	< 5	< 5	< 10	< 10	< 5	< 10	< 5	< 1.82	< 5	< 10	< 1.85
TB	10/02/97	< 0.2	< 5.0	< 0.2	< 0.2	< 0.4	< 0.3	< 0.1	< 0.3	< 0.3	< 0.3	< 0.2	< 0.3	< 0.3
TB	01/14/98	< 0.2	< 5.0	< 0.2	< 0.2	< 0.3	< 0.2	< 0.1	< 0.3	< 0.2	< 0.3	< 0.2	< 0.2	< 0.3
TB	03/17/98	< 10	< 34	< 5	< 5	< 10	< 10	< 5	< 10	< 5	< 1.82	< 5	< 10	< 1.85
TB	12/01/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
TB	12/07/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
TB	12/21/98	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
TB	01/20/99	< 0.1	< 4.8	0.20 J	< 0.1	< 0.5	< 0.2	0.20 J	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3
TB	07/14/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	0.30 J	< 0.2	< 0.2	< 0.3
TB	07/21/99	< 0.1	--	< 0.2	< 0.1	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
TB	09/01/99	< 0.1	--	< 0.2	0.20 J	< 0.5	< 0.2	--	< 0.4	< 0.4	< 0.1	< 0.2	< 0.2	< 0.3
TB	02/02/00	< 0.1	28	--	0.26	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
TB	05/30/00	< 0.1	< 8.1	< 0.2	0.24 J	0.21 J	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
TB	07/13/00	< 0.1	--	--	0.55 J	< 0.2	< 0.2	--	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
TB	03/08/01	< 0.1	35	< 0.2	0.97	0.22	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
TB	05/10/01	< 0.1	--	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
TB	06/27/01	< 0.1	< 8.1	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1	< 0.4	< 0.1	< 0.2	< 0.1	< 0.1
TB	11/26/01	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18
TB	07/17/02	< 0.21	< 3.7	< 0.16	< 0.12	< 0.4	< 0.28	< 0.27	< 0.5	< 0.8	< 0.15	< 0.14	< 0.4	< 0.18

Notes:

- All concentrations are in ug/L, unless noted.
- Blank indicates compound not detected.
- J = estimated result; detected between minimum detection limit and practical quantitation limit.
- VOC = volatile organic compound.
- MCL = federal maximum contaminant level.
- ES = Wisconsin enforcement standard.
- PAL = Wisconsin preventative action limit.
- As reported in the 1992 RI/FS, private wells sampled on 7/6/84, 1/30/91, 5/3/91, and 8/28/91 had no detections of VOCs, therefore no results are listed in this table.
- Private well locations for RI/FS associated sampling events are shown on Drawing 13527-B25 in Appendix A).
- Private well locations for post-RI/FS sampling events are shown on Figure 1.
- Result is qualified not detected, based on method blank contamination.
- = No analysis completed.
- Private well PW-5 (Kent) analysis on October 4, 1982 reported <10ug/L for 1,2-Dichloroethane, Dichloroethene, 1,1,1-Trichloroethane, and Tetrachloroethene.
- Results taken from Singh Report (2001) Table 3.3 Assessment Groundwater Quality for Muskego Sanitary Landfill and Private Residences, City of Muskego, Waukesha County, WI. NR = the compound was not reported for these analyses. These data are unverified.
- Vinyl chloride was detected below the limit of quantitation in the Loppnow well on 05/30/00, however a split sample taken by the WDNR on that same date did not indicate the presence of vinyl chloride. The Loppnow well was re-sampled on 07/13/00 and confirmed the WDNR split sample result indicating that the detection of vinyl chloride on 05/30/00 was a false positive. However, during the re-sample on 07/13/00, chlorobenzene was detected and toluene was detected below the limit of quantitation. Chlorobenzene was detected in the trip blank and toluene has not been detected in recent private well sampling events. The 07/13/00 WDNR split sample did not indicate the presence of any VOCs. Therefore both of these detections are likely false positives. VOC results for Loppnow May 30, 2000 use the WDNR split results.

Table 2
Summary of Private Well Analytical Data - VOCs
Muskego Sanitary Landfill
Muskego, Wisconsin

Sample Description	Sample Date	Concentration (ug/L)												
		1,4-Dichloro- benzene	Acetone	Bromoform	Chloro- benzene	Chloro- methane	cis-1,2- Dichloroethene	Dibromo- chloromethane	Dichloro- difluoromethane	Methylene Chloride	Tetrachloro- ethene	Toluene	Trans-1,2- Dichloroethene	Vinyl Chloride
MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
PRE-RI SAMPLING EVENTS														
PW-1	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	14	< 10
PW-2	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-5 ¹³	10/04/82	--	--	--	--	--	< 10	--	--	--	< 10	--	< 10	--
PW-6	07/16/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-6	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-8	01/30/91	< 0.5	--	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PW-8	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-9	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-9	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-10	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-10	05/03/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0
PW-11	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-12	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-12	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-12	08/28/91	--	< 75	< 1.0	< 1.0	< 2.0	--	< 1.0	--	< 2.0	< 2.0	< 1.0	--	< 2.0
PW-14	01/30/91	< 0.5	--	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PW-15	01/31/91	< 0.5	--	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PW-22	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-D	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-D	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-E	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-E	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-F	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-F	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-G	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PW-G	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PETERS (PW26)	07/06/84	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
PETERS (PW26)	10/02/84	< 10	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
A. VITRANO	07/17/84	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
POST RI SAMPLING														
ANTHONY VITRANO	07/02/97	< 10	< 34	< 5	< 5	< 10	< 10	< 5	< 10	< 5	< 1.82	< 5	< 10	2
ANTHONY VITRANO	10/02/97	< 0.2	< 5.0	< 0.2	< 0.2	< 0.4	< 0.3	< 0.1	< 0.3	< 0.3	< 0.3	< 0.2	< 0.3	2
ANTHONY VITRANO	01/14/98	< 0.2	< 5.0	< 0.2	< 0.2	< 0.3	< 0.2	< 0.1	< 0.3	< 0.2	< 0.3	< 0.2	< 0.2	2
ANTHONY VITRANO-dup	01/14/98	< 0.2	< 5.0	< 0.2	< 0.2	< 0.3	< 0.2	< 0.1	< 0.3	< 0.2	< 0.3	< 0.2	< 0.2	2.3
ANTHONY VITRANO ¹⁴	05/26/99	NR	NR	NR	NR	< 0.60	< 0.50	NR	NR	NR	< 0.50	0.63	< 0.50	2.1
ANTHONY VITRANO ¹⁴	08/26/02	NR	NR	NR	NR	< 0.600	< 0.500	NR	NR	NR	< 0.500	< 0.500	< 0.500	0.838
ACKER	03/17/98	0.2 J	< 34	< 5	< 5	< 10	< 10	< 5	0.7 J	< 5	< 1.82	< 5	< 10	< 1.85
BEILFUSS	01/20/99	< 0.1	< 4.8	< 0.2	< 0.1	< 0.5	< 0.2	< 0.2	< 0.4	< 0.4	< 0.2	< 0.2	< 0.2	< 0.3

Table 2
Summary of Private Well Analytical Data - VOCs
Muskego Sanitary Landfill
Muskego, Wisconsin

Sample Description	Sample Date	Concentration (ug/L)												
		1,4-Dichloro- benzene	Acetone	Bromoform	Chloro- benzene	Chloro- methane	cis-1,2- Dichloroethene	Dibromo- chloromethane	Dichloro- difluoromethane	Methylene Chloride	Tetrachloro- ethene	Toluene	Trans-1,2- Dichloroethene	Vinyl Chloride
MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
CAMPBELL	01/20/99	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
DYER BARN	03/17/98	<10	<34	<5	<5	<10	<10	<5	<10	<5	<1.82	<5	<10	1.0 J
DYER BARN	12/01/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	1.2
DYER BARN ¹⁴	05/26/99	NR	NR	NR	NR	<0.60	<0.50	NR	NR	NR	<0.50	<0.50	<0.50	1.9
DYER BARN ¹⁴	02/08/00	NR	NR	NR	NR	<0.60	<0.50	NR	NR	NR	<0.50	<0.50	<0.50	1.9
DYER BARN ¹⁴	02/04/01	NR	NR	NR	NR	<0.500	<0.500	NR	NR	NR	<0.500	<0.500	<0.500	1.11
DYER HOUSE	03/17/98	<10	<34	<5	<5	<10	2.0 J	<5	<10	<5	<1.82	<5	<10	1.0 J
DYER HOUSE ¹⁴	03/17/98	NR	NR	NR	NR	ND	1.9	NR	NR	NR	ND	ND	ND	2.8
DYER HOUSE	12/01/98	<0.1	<4.8	<0.2	<0.1	<0.5	1.8	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	1.1
DYER HOUSE ¹⁴	05/26/99	NR	NR	NR	NR	<0.60	2.7	NR	NR	NR	<0.50	<0.50	<0.50	2.9
DYER HOUSE ¹⁴	02/08/00	NR	NR	NR	NR	<0.60	2.7	NR	NR	NR	<0.50	<0.50	<0.50	1.0
DYER HOUSE ¹⁴	02/04/01	NR	NR	NR	NR	<0.500	2.14	NR	NR	NR	<0.500	<0.500	<0.500	1.48
DYER HOUSE ¹⁴	08/26/02	NR	NR	NR	NR	<0.600	0.638	NR	NR	NR	<0.500	<0.500	<0.500	0.548
FEINAUER	03/17/98	<10	<34	<5	<5	<10	<10	<5	<10	<5	<1.82	<5	<10	<1.85
FEINAUER	12/01/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
FEINAUER	12/21/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
FEINAUER	07/21/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
FEINAUER DUP	07/21/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
FISCHER	10/02/97	<0.2	<5.0	<0.2	<0.2	<0.4	<0.3	<0.1	<0.3	<0.3	<0.3	<0.2	<0.3	<0.3
FISCHER ¹⁴	06/18/99	NR	NR	NR	NR	<0.60	<0.50	NR	NR	NR	<0.50	<0.50	<0.50	<0.17
FISCHER	07/14/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
FISCHER	07/21/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
FISCHER	02/02/00	<0.1	<8.1	-	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
FISCHER	05/30/00	<0.1	<8.1	<0.2	<0.1	0.28 J	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
FISCHER	06/27/01	<0.1	<8.1	<0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
FISCHER DUP	06/27/01	<0.1	<8.1	<0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
FISCHER	11/26/01	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
FISCHER DUP	11/26/01	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
FISCHER	07/17/02	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
FISCHER ¹⁴	08/26/02	NR	NR	NR	NR	<0.600	<0.500	NR	NR	NR	<0.500	<0.500	<0.500	<0.170
FISCHER	11/11/02	<0.33	<4.8	<0.40	<0.20	<0.35	<0.19	<0.31	<0.21	<0.69	<0.34	<0.29	<0.25	<0.22
FISCHER DUP	11/11/02	<0.33	<4.8	<0.40	<0.20	<0.35	<0.19	<0.31	<0.21	<0.69	<0.34	<0.29	<0.27	<0.22
GROSS	05/10/01	<0.1	-	<0.2	<0.1	0.39 U	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.4	<0.1
GUMIENY	01/20/99	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.4	<0.3

Table 2
Summary of Private Well Analytical Data - VOCs
Muskego Sanitary Landfill
Muskego, Wisconsin

Sample Description	Sample Date	Concentration (ug/L)												
		1,4-Dichloro- benzene	Acetone	Bromoform	Chloro- benzene	Chloro- methane	cis-1,2- Dichloroethene	Dibromo- chloromethane	Dichloro- difluoromethane	Methylene Chloride	Tetrachloro- ethene	Toluene	Trans-1,2- Dichloroethene	Vinyl Chloride
MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
KNUTSON	07/21/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
KRABBEHOFT	05/10/01	<0.1	-	<0.2	<0.1	0.38 U	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
KRABBEHOFT DUP	05/10/01	<0.1	-	<0.2	<0.1	0.41 U	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
LOPPNOW	03/17/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
LOPPNOW	12/01/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
LOPPNOW DUP	12/01/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
LOPPNOW	12/21/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
LOPPNOW	07/14/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
LOPPNOW	02/02/00	<0.1	<8.1	-	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
LOPPNOW	05/30/00	<0.1	<8.1	<0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	0.22 J
LOPPNOW	07/13/00	<0.1	-	-	<0.1	<0.2	<0.2	-	<0.1	<0.4	<0.1	0.21 J	<0.1	<0.1
MAGESKE (PW-M)	01/30/91	<0.5	-	<0.5	<0.5	<5.0	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5
MAGESKE (PW-M)	07/02/97	<10	<34	<5	<5	<10	<10	<5	<10	<5	<1.82	<5	<10	<1.85
MAGESKE (PW-M)	10/02/97	<0.2	<5.0	<0.2	<0.2	<0.4	<0.3	<0.1	<0.3	<0.3	<0.3	<0.2	<0.3	<0.3
MAGESKE (PW-M)	03/08/01	<0.1	<8.1	<0.2	<0.1	0.21	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
MAGESKE (PW-M)	11/26/01	<0.21	<3.7	<0.16	<0.12	0.55 J	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
MAGESKE (PW-M)	07/17/02	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
MAGESKE (PW-M) ¹⁴	08/26/02	NR	NR	NR	NR	<0.600	<0.500	NR	NR	NR	<0.500	<0.500	<0.500	0.493
MITSCH	01/20/99	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
MOELLER ¹⁴	05/26/99	NR	NR	NR	NR	<0.60	<0.50	NR	NR	NR	<0.50	<0.50	<0.50	1.4
MOELLER ¹⁵	08/23/99	NR	NR	NR	NR	<0.15	<0.15	NR	NR	NR	<0.15	<0.15	<0.15	1.8
MOELLER ¹⁶	08/26/02	NR	NR	NR	NR	<0.600	<0.500	NR	NR	NR	<0.500	<0.500	<0.500	3.02
MOODY	07/14/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
MOODY DUP	07/14/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
PET SUPPLIES	07/14/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
PET SUPPLIES	09/01/99	<0.1	-	<0.2	<0.1	<0.5	<0.2	-	<0.4	<0.4	<0.1	<0.2	<0.2	0.50 J
PRIES	01/20/99	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
PRIES	05/30/00	<0.1	<8.1	<0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
PRIES	06/27/01	<0.1	<8.1	<0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
PRIES	11/26/01	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
PRIES	07/17/02	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
PRIES	11/11/02	<0.33	<4.8	<0.40	<0.20	<0.35	<0.19	<0.31	<0.21	<0.69	<0.34	<0.29	<0.25	<0.22

Table 2
Summary of Private Well Analytical Data - VOCs
Muskego Sanitary Landfill
Muskego, Wisconsin

Sample Description	Sample Date	Concentration (ug/L)												
		1,4-Dichloro- benzene	Acetone	Bromoform	Chloro- benzene	Chloro- methane	cis-1,2- Dichloroethene	Dibromo- chloromethane	Dichloro- difluoromethane	Methylene Chloride	Tetrachloro- ethene	Toluene	Trans-1,2- Dichloroethene	Vinyl Chloride
MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02
SCHMIDT	03/08/01	<0.1	<8.1	<0.2	<0.1	0.23	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
SCHMIDT	11/26/01	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
SCHMIDT	07/17/02	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	0.58 J	<0.5	<0.8	<0.15	0.35 J	<0.4	<0.18
SCHMIDT	11/11/02	<0.33	<4.8	<0.40	<0.20	<0.35	<0.19	<0.31	<0.21	<0.69	<0.34	<0.29	<0.25	<0.22
SEYBOLD	07/21/99	<0.1	--	<0.2	<0.1	<0.5	<0.2	--	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
SHANE	01/20/99	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
SHANE DUP	01/20/99	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
THEILE	07/02/97	<10	<34	<5	<5	<10	<10	<5	<10	<5	<1.82	<5	<10	1.0 J
THEILE	10/02/97	<0.2	<5.0	<0.2	<0.2	<0.4	<0.3	<0.1	<0.3	<0.3	<0.3	<0.2	<0.3	1.0 J
THEILE	01/14/98	<0.2	<5.0	<0.2	<0.2	<0.3	<0.2	<0.1	<0.3	<0.2	<0.3	<0.2	<0.2	1.0 J
THOMAS VITRANO	03/17/98	<10	<34	<5	<5	<10	0.40 J	<5	<10	<5	<1.82	<5	<10	2
THOMAS VITRANO	12/07/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	2.5
THOMAS VITRANO	12/21/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	2.4
THOMAS VITRANO DUP	12/21/98	<0.1	<4.8	<0.2	<0.1	<0.5	0.50 J	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	1.7
THOMAS VITRANO	05/26/99	NR	NR	NR	NR	<0.60	<0.50	NR	NR	NR	<0.50	<0.50	<0.50	1.1
THOMAS VITRANO	08/26/02	NR	NR	NR	NR	<0.600	<0.500	NR	NR	NR	<0.500	1.24	<0.500	<0.170
TB	07/02/97	<10	<34	<5	<5	<10	<10	<5	<10	<5	<1.82	<5	<10	<1.85
TB	10/02/97	<0.2	<5.0	<0.2	<0.2	<0.4	<0.3	<0.1	<0.3	<0.3	<0.3	<0.2	<0.3	<0.3
TB	01/14/98	<0.2	<5.0	<0.2	<0.2	<0.3	<0.2	<0.1	<0.3	<0.2	<0.3	<0.2	<0.2	<0.3
TB	03/17/98	<10	<34	<5	<5	<10	<10	<5	<10	<5	<1.82	<5	<10	<1.85
TB	12/01/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
TB	12/07/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
TB	12/21/98	<0.1	<4.8	<0.2	<0.1	<0.5	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
TB	01/20/99	<0.1	<4.8	0.20 J	<0.1	<0.5	<0.2	0.20 J	<0.4	<0.4	<0.2	<0.2	<0.2	<0.3
TB	07/14/99	<0.1	--	<0.2	<0.1	<0.5	<0.2	--	<0.4	<0.4	0.30 J	<0.2	<0.2	<0.3
TB	07/21/99	<0.1	--	<0.2	<0.1	<0.5	<0.2	--	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
TB	09/01/99	<0.1	--	<0.2	0.20 J	<0.5	<0.2	--	<0.4	<0.4	<0.1	<0.2	<0.2	<0.3
TB	02/02/00	<0.1	28	--	0.26	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
TB	05/30/00	<0.1	<8.1	<0.2	0.24 J	0.21 J	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
TB	07/13/00	<0.1	--	--	0.55 J	<0.2	<0.2	--	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
TB	03/08/01	<0.1	35	<0.2	0.97	0.22	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
TB	05/10/01	<0.1	--	<0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
TB	06/27/01	<0.1	<8.1	<0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.4	<0.1	<0.2	<0.1	<0.1
TB	11/26/01	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18
TB	07/17/02	<0.21	<3.7	<0.16	<0.12	<0.4	<0.28	<0.27	<0.5	<0.8	<0.15	<0.14	<0.4	<0.18

Table 2
Summary of Private Well Analytical Data - VOCs
Muskego Sanitary Landfill
Muskego, Wisconsin

Sample Description	Sample Date	Concentration (ug/L)												
		1,4-Dichloro- benzene	Acetone	Bromoform	Chloro- benzene	Chloro- methane	cis-1,2- Dichloroethene	Dibromo- chloromethane	Dichloro- difluoromethane	Methylene Chloride	Tetrachlor- ethene	Toluene	Trans-1,2- Dichloroethene	Vinyl Chloride
MCL		NA	NA	NA	100	NA	70	NA	NA	NA	5	100	100	2
ES		75	1000	4.4	NA	3	70	60	1000	5	5	1000	100	0.2
PAL		15	200	0.44	NA	0.3	7	6	200	0.5	0.5	200	20	0.02

Notes:

1. All concentrations are in ug/L, unless noted.
2. Blank indicates compound not detected.
3. J = estimated result; detected between minimum detection limit and practical quantitation limit.
4. VOC = volatile organic compound.
5. MCL = federal maximum contaminant level.
6. ES = Wisconsin enforcement standard.
7. PAL = Wisconsin preventative action limit.
8. As reported in the 1992 RI/FS, private wells sampled on 7/6/84, 1/30/91, 5/3/91, and 8/28/91 had no detections of VOCs, therefore no results are listed in this table.
9. Private well locations for RI/FS associated sampling events are shown on Drawing 13527-B25 in Appendix A).
10. Private well locations for post-RI/FS sampling events are shown on Figure 1.

* = Vinyl chloride was detected below the limit of quantitation in the Loppnow well on 05/30/00, however a split sample taken by the WDNR on that same date did not indicate the presence of vinyl chloride. The Loppnow well was re-sampled on 07/13/00 and confirmed the WDNR split sample result indicating that the detection of vinyl chloride on 05/30/00 was a false positive. However, during the re-sample on 07/13/00, chlorobenzene was detected and toluene was detected below the limit of quantitation. Chlorobenzene was detected in the trip blank and toluene has not been detected in recent private well sampling events. The 07/13/00 WDNR split sample did not indicate the presence of any VOCs. Therefore both of these detections are likely false positives.

11. Result is qualified not detected, based on method blank contamination.

12. -- = No analysis completed.

13. Private well PW-5 (Kent) analysis on October 4, 1984 reported <10ug/L for 1,2-Dichloroethane, Dichloroethene, 1,1,1-Trichloroethane, and Tetrachloroethene.

14. Results taken from Singh Report (2001) Table 3.3 Assessment Groundwater Quality for Muskego Sanitary Landfill and Private Residences, City of Muskego, Waukesha County, WI. NR = the compound was not reported for these analyses

TABLE 2

**Existing and Former Private Well Identifiers
Muskego Sanitary Landfill**

<u>Current Well Identifier</u>	<u>Other Well Identifiers</u>	<u>Resident in 1992 (Time of RI)</u>	<u>Address</u>
PW-01		Jacobi (WMNA)	W217 S8464 Crowbar Road
PW-02		Moose Lodge	S86 W21693 Janesville Road
PW-03		Klem Knutkowski	S86 W21695 Janesville Road
PW-04		Camille Realty	S85 W21531 Janesville Road
PW-05		Robert Scoffidi	S85 W21412 Janesville Road
PW-06		Resident	S85 W21364 Janesville Road
PW-06		Resident	S83 W20727 Janesville Road
PW-08	Acker, Wagonwheel Stagecoach	Stagecoach Inn	S85 W21175 Janesville Road
PW-09		Arthur Zangerle	S84 W20938 Janesville Road
PW-10		Mike Dubiak	S84 W20858 Janesville Road
PW-11		Gerry Schimmel	W208 S8381 Hillendale Drive
PW-12		Mark Sawyer	W208 S8343 Hillendale Drive
PW-13		Howard Kleinman	W208 S8307 Hillendale Drive
PW-14		Lawrence Schmidt	W208 S8285 Hillendale Drive
PW-15		Dorothy Keith	W208 S8241 Hillendale Drive
PW-20		Anamax Rendering Plant	Wauer Lane
PW-21		Melvin Ackman	W208 S8481 Hillendale Drive
PW-22	Purdy, Moeller	Kenneth Purdy	W208 S8543 Hillendale Drive
PW-24		Ronald & C Neitzel	W207 S8250 Hillendale Drive
PW-25		Frank Aiuppa	W207 S8286 Hillendale Drive
PW-26		Gary Peters	W207 SB312 Hillendale Drive
PW-27	WMWI	WMWI Well Replacing PW-4, PR-5, PW-6	S85 W21364 Janesville Road
PW-28		Don Ross	W217 S8790 Crowbar Road
PW-D		Donald Burg	S83 W20607 Janesville Road
PW-D		John Burg	S83 W20605 Janesville Road
PW-E		John Krabbenhoft	S83 W20618 Janesville Road
PW-F		Greg Pasky	S83 W20702 Janesville Road
PW-G		Herbert Sackman	W207 S8602 Hillendale Drive
PW-I		VFW	S83 W20778 Janesville Road
PW-J		Vernon Eder	S83 W20729 Janesville Road
PW-M		Edward Mageske	S83 W20671 Janesville Road
PW-M	PWC	Rental	S83 W20703 Janesville Road
PW-N		Wm. J. Whitehouse	S83 W20765 Janesville Road
Schmidt			
Fischer			W207 S8686 Hillendale Drive
Knudsen			
Gross			
Thiele	PWThil		
Pet Supply			
T Vitrano	Vitran2		
A Vitrano	Vitran		W208 S8861 Hillendale Road
Fennauer	Finau		
Dyer House	DyerH		W208 S8903 Hillendale Road
Dyer Barn	DyerB		W208 S8903 Hillendale Road
Loppnow	Lopnow		W208 S8905 Hillendale Road
Pries			
Gumeny			
Bielfus			
Mitsch			
Seybold			W208 S8475 Woods Rd
Moody			W200 S8906 Woods Rd

Notes:

1. This table was originally Table 12 in the Remedial Investigation Report

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 14

**STATISTICAL ANALYSIS REPORT
SEPTEMBER 2004**



Muskego Sanitary Landfill Statistical Analysis Report

Sampling Period: February 1973 to October 2003

Prepared By:



Volpe National Transportation Systems Center
U.S. Department of Transportation
On behalf of EPA Region 5
September 2004

INTRODUCTION

On behalf of EPA Region 5, the Volpe National Transportation Systems Center (Volpe Center) performed a statistical analysis on the groundwater monitoring data collected from the Muskego Sanitary Landfill Superfund site. For this analysis, the Volpe Center utilized the environmental statistic software application CARStat (Compliance, Assessment, Remediation Statistics) from Discerning Systems Inc. The analysis compared the contaminant concentrations obtained from on-site groundwater sampling to the EPA mandated clean-up standards. The analysis also examined natural attenuation of the contaminant concentrations. Finally, the analysis identified increasing or decreasing trends in the contaminant concentrations over time. The purpose of the analysis is to provide statistical support for assessing the progress and effectiveness of the site's groundwater remediation.

SITE BACKGROUND

The Muskego Sanitary Landfill Superfund site, located in Muskego, Waukesha County, Wisconsin, covers 56 acres that include a former landfill and an adjacent former animal rendering facility. The site is approximately three miles south of the center of the City of Muskego and one mile west of the Village of Big Bend, and is located at Highway 24 (Janesville Road) and Crowbar Road, which bound the site on the south and west, respectively. To the north of the site is another landfill, which is not a part of the Superfund site. The animal rendering plant was also to the north of the former landfill. The owner of the Muskego Sanitary Landfill is Carl Wauer, and the last operator of the landfill was Waste Management of Wisconsin, Inc. (WMWI). The last operator of the animal rendering plant was Anamax.

The landfill was originally a sand and gravel quarry that was converted by its owner into a public dump in 1954. In 1969, Acme Disposal, a subsidiary of Waste Management of Wisconsin, Inc. (WMWI), leased and began operating the dump. In 1971, the dump was licensed as a sanitary landfill by the Wisconsin Department of Natural Resources.

The site is divided into three distinct parts: (1) the Old Fill Area, (2) the Southeast Fill Area, and (3) the Non-Contiguous Fill Area. The Old Fill Area is 38 acres that accepted various types of waste material from the mid-1950s until 1977. The Old Fill Area includes the portion of the site that was originally a sand and gravel quarry. The Southeast Fill Area is approximately 16 acres that accepted municipal wastes from 1977 to 1981. It is located east and southeast of the Old Fill Area. The Non-Contiguous Fill Area is approximately 4.2 acres where various types of wastes were dumped. It consists of four totally separate parts: (1) two elongated fill areas, (2) an "L-shaped" fill area, and (3) a drum trench. Part of the Non-Contiguous Fill Area is located on the former Anamax site. The site also includes wastewater ponds associated with the former Anamax facility.

The site is located within the Fox River watershed. There are no streams or wetlands within or adjacent to the site. The flow of groundwater at the site takes two flow paths.

The first is north to south under the eastern portion of the Old Fill Area. The second flow path is generally to the southeast under the Southeast and Non-Contiguous Fill Areas.

Two Records of Decision (RODs) for the site have been issued. The initial Record of Decision (ROD) for the site was dated June 12, 1992. That ROD presented the selected interim remedial action for the site. The remedy included (1) deed restrictions, (2) fence extensions, (3) cap installation, (4) landfill leachate installation or upgrade, (5) active landfill gas control and monitoring, (6) in-situ soil vapor extraction, (7) groundwater monitoring, and (8) system operation and maintenance. A second ROD for the site was dated February 2, 1995. That ROD presented the final remedy for the site, which included (1) groundwater monitoring, (2) groundwater pumping tests, (3) installation and operation of a groundwater extraction system in the vicinity of the Non-Contiguous Fill Area, (4) on-site treatment and discharge of extracted groundwater from the Non-Contiguous Fill Area, (5) disposal of treatment residuals, if any, at an approved disposal facility, (6) monitoring and evaluation of the groundwater extraction system, and (7) expansion of the groundwater extraction system, if necessary.

Three Unilateral Administrative Orders (UAOs) have also been issued for the site. The initial UAO for the site was issued to WMWI in 1987. That UAO directed WMWI to finance and conduct a Remedial Investigation (RI) at the site. A second UAO was issued to 46 potentially responsible parties (PRPs), including WMWI in 1992. This UAO directed the PRPs construct a landfill cap and leachate and gas collection systems. This construction was completed in 1994. In June 1995, a third UAO was issued for a limited pump-and-treat system focusing on groundwater contamination in the non-contiguous fill area. This work was completed in 1997.

STATISTICAL TESTS

Three different statistical tests were run on the site data. A brief description of the statistical tests is provided. A detailed description of the tests, including the relevant equations of each test, is provided in the "CARStat 2.1.1 Statistical Guide" and "CARStat 2.1.1 Users Manual".

- **Comparison to Standard**

The comparison to standard test takes onsite, down-gradient data and computes a statistical upper confidence limit (UCL), which is compared to the clean-up standard. If the UCL is above the standard, an exceedance is declared. This test is important in determining if a site has achieved its clean-up goals because looking at a single measurement indicates very little about the true concentration at a sampling location.

- **Comparison to Baseline**

The comparison to baseline test takes a user defined baseline period, generally the first two-years of sampling, and calculates an upper prediction limit (UPL) and a

lower prediction limit (LPL) of the contaminant concentrations for that period. All subsequent samples are compared to the baseline period. If a sample pops above the UPL then the site is declared significantly worse, while if a sample drops below the LPL it is declared significantly better.

▪ Trend Analysis

Trend analysis was performed using Sen's non-parametric test for trend. This test is well suited for environmental data that typically have irregular spaced measurement periods and non-detect data. The Sen's test is used to identify both increasing and decreasing trends.

In order to compute the prediction and confidence limits identified above, choices must be made with regard to a number of statistical options. Table 1 shows the options used for this analysis for each of the statistical tests. The trend analysis is automatically performed by CARStat during each of the other three tests and does not require separate statistical options.

Table 1: Statistical Options

Statistical Test	Statistical Option	Option Choice
All	Confidence Level	95%
	Data Distribution Fit	Normal or non-parametric (as appropriate)
Comparison to Standard	Percentile Compared	50th (translates to the mean for normally distributed data)
	Time Period	Most recent four samples
Comparison to Baseline	Baseline Time Period	February 1973 to February 1999 (includes the first 8 samples for most currently sampled locations)

ANALYSIS METHODOLOGY

Statistical tests were performed for each contaminant at each individual sampling location. The following methodology was used to perform the statistical analysis for the individual wells.

1. The upper confidence limit (UCL) for the contaminant concentration of the most recent 4 samples in each well was compared to the clean-up standard using the comparison to standard test.

2. Comparison to baseline tests were run at each well location to identify those locations where intrawell contamination was improving or getting worse.
3. Trend analysis was performed during each of the statistical tests.

DATA DETAILS

The statistical analysis used 110 rounds of field sample data collected between February 1973 and October 2003. The collection of data was not identical for each monitoring site and contaminant, however, and the number of samples collected from individual monitoring sites varied widely. At least 4 samples (i.e., data points) from a sampling location are required to run the statistical tests; therefore, sites with less than 4 samples could not be included in the statistical analysis. Data was analyzed from the samples collected from the 87 monitoring sites identified in Table 2.

Table 2: Monitoring Wells

Monitoring Well	Well Type	Well Location
E04	Water table observation well	
E07	Water table observation well	
E10	Water table observation well	
E11C	Piezometer	
E123B	Piezometer	Southern flow path
E135A	Water table observation well	Southern flow path
E135B	Piezometer	Southern flow path
E137A	Piezometer	Southern flow path
E137B	Piezometer	Southern flow path
E140	Water table observation well	
E141A	Water table observation well	
E141B	Piezometer	
E15A	Water table observation well	
E15B	Piezometer	
E15C	Piezometer	
E17-A	Water table observation well	
E17-B	Water table observation well	
E17R	Water table observation well	Non-contiguous flow area
E21A	Piezometer	
E21B	Piezometer	
E21C	Piezometer	
E24	Water table observation well	
E30	Water table observation well	
E48	Water table observation well	
E92P	Piezometer	Southeast flow path
E93D	Piezometer	
E93P	Piezometer	
E94	Piezometer	
E94P	Piezometer	

E95	Piezometer	
E95P	Piezometer	Southern flow path
EW-1	Gas extraction system	
EW-2	Gas extraction system	
EW-3	Gas extraction system	
FARMER'S WELL	Private well – potable	
GP-13	Gas probe	
GP-14	Gas probe	
GP-15	Gas probe	
GP-16	Gas probe	
GV-12B	Gas probe	
GV-46	Gas probe	
M05	Water table observation well	
MMSD-MANHOLE	Other	
NE RISER 2	Leachate collection system	
P64A	Water table observation well	
P64B	Piezometer	
P64C	Piezometer	Southeast flow path
P66A	Water table observation well	
P66C	Piezometer	
P67A	Piezometer	
P67B	Water table observation well	
P68 (TW68)	Leachate collection system	
POND	Surface water	
PW-A	Private well – potable	
PW-C	Private well – potable	
PW-D	Private well – potable	
PW-E	Private well – potable	
PW-F	Private well – potable	
PW-G	Private well – potable	
PW-H	Private well – potable	
PW-I	Private well – potable	
PW-J	Private well – potable	
PW-M	Private well – potable	
PW-N	Private well – potable	
PW-THIELE	Private well – potable	
PW-VITRANO	Private well – potable	
PW01	Private well – potable	
PW02	Private well – potable	
PW04	Private well – potable	
PW05	Private well – potable	
PW06	Private well – potable	
PW08	Private well – potable	
PW09	Private well – potable	
PW10	Private well – potable	
PW11	Private well – potable	
PW12	Private well – potable	
PW13	Private well – potable	
PW20	Private well – potable	
PW21	Private well – potable	

PW22	Private well – potable	
PWWMI	Private well – potable	
SE RISER 3	Leachate collection system	
TW-77	Water table observation well	
TW60	Water table observation well	
TW62	Water table observation well	
TW65P	Piezometer	

This analysis focused on the contaminants of concern identified in Wisconsin Dept. of Public Health & Social Services, “Public Health Assessment, Muskego Sanitary Landfill, Muskego, Waukesha County, Wisconsin,” CERCLIS No. WID000713180, Sept. 6, 1994. Those contaminants and associated clean-up standards are presented in Table 3.

Table 3: Contaminants of Concern

Contaminate*	WI ES Standard** ug/L	WI PAL Standard*** ug/L
Benzene	5	0.5
1,2-Dichloroethane	5	0.5
1,2-Dichloropropane	5	0.5
Tetrachloroethylene	5	0.5
Trichloroethylene (TCE)	5	0.5
Vinyl Chloride	0.2	0.02
Chromium	100	10
Lead	15	1.5

* Table 7 in Wisconsin Dept. of Public Health & Social Services, “Public Health Assessment, Muskego Sanitary Landfill, Muskego, Waukesha County, Wisconsin,” CERCLIS No. WID000713180, Sept. 6, 1994. The Contaminants of Concern listed in Table 7 also include 1,2-Dichloroethylene and Methylene Chloride; however, groundwater samples from Muskegon have not been tested for those contaminants.

** Enforcement Standard (ES), Subchapter II – Groundwater Quality Standards NR140.10, Table 1, State of Wisconsin (see Register, Feb. 2004, No. 578 at < www.legis.state.wi.us/rsb/code/nr/nr140.pdf>).

***Preventive Action Limit (PAL), Subchapter II - Groundwater Quality Standards NR140.10, Table 1, State of Wisconsin (see Register, Feb. 2004, No. 578 at < www.legis.state.wi.us/rsb/code/nr/nr140.pdf>).

RESULTS

This section summarizes the results of the statistical analysis based on the methodology outlined in the previous section. Detailed results of the analysis including graphs, tables and equations from all the statistical tests are provided in the appendix.

Table 4a summarizes the results of the statistical tests performed on the contaminants of concern. Only the wells with at least one statistically significant result are listed in the table. A statistical significant result includes contamination exceeding the cleanup standard, contamination becoming significantly worse or better, or contamination showing an increasing or decreasing trend. The following is a description of the statistical significant results in presented in Table 4a.

- **Exceeded Standard (Comparison to Standard Test)**

“Yes” means the UCL for the contaminant concentration of the most recent 4 samples exceeded the Wisconsin Enforcement clean-up standard. These well locations are considered contaminated. Table 4b lists the wells and contaminants that exceeded the Wisconsin Preventive Action Level.

- **Significantly Worse or Better (Comparison to Baseline Test)**

“Significantly Worse” means the contaminant concentration of the most recent sample exceed the baseline UPL for that well location. This signifies the concentration of the most recent sample statistically exceeds previous sample concentrations within the well and is evidence that the contamination is becoming worse at the well location.

“Significantly Better” means the contamination concentration of the most recent sample was below the baseline LPL for that well location. This signifies the concentration of the most recent sample was statistically below previous concentrations of the well and is evidence that the contamination is significantly better at the well location.

- **Increasing or Decreasing Trend (Sen’s Test)**

“Increasing” signifies the contaminant concentration within a well is increasing over time. Attention should be given to wells with increasing trends since this could signify migration of the contaminant, non-containment of the contamination source, or other possible problems with the remediation process. “Decreasing” signifies the contamination within a well is decreasing over time. A decreasing trend signifies that the contamination at the particular well location is degrading.

Table 5 provides a summary of the results in a cross-tab format by well location and contaminant.

Table 4. Statistically Significant Results

Contaminants and Wells	UCL	Standard (Enforcement Standard)	Exceed WI-ES Standard	Worse or Better?	Trend
1,2-Dichloroethane		5 ug/L			
E137A				Better	
1,2-Dichloropropane		5 ug/L			
E141A				Better	Decreasing
EW-2					Decreasing
Benzene		5 ug/L			
E140	13.582		Yes		
E141A					Decreasing
EW-1	6.743		Yes	Better	
Chromium		100 ug/L			
NE Riser 2	1042.653		Yes	Better	Decreasing
TW-77	1336.915		Yes		
Chromium, dissolved		100 ug/L			
E94P	153.758		Yes		
Lead		15 ug/L			
NE Riser 2	3010.810		Yes		
P68 (TW68)	86.572		Yes		
PW-F	15.491		Yes		
PW-H				Better	
PW06	57.688		Yes		
PW22	16.104		Yes		
SE Riser 3	78.195		Yes		
TW-77	5256.310		Yes		
Lead, dissolved		15 ug/L			
P68 (TW68)	136.427		Yes		
Tetrachloroethylene		5 ug/L			
E123B				Better	Decreasing
Trichloroethylene (TCE)		5 ug/L			
E123B				Better	Decreasing
E135B				Better	Decreasing
E137A				Better	Decreasing
E141A				Better	
Vinyl Chloride		0.2 ug/L			
E123B	0.925		Yes		
E135A	1.021		Yes		
E135B	1.133		Yes		
E137A	1.023		Yes		
E137B	2.179		Yes		
E140	1.052		Yes		
E141A	2.464		Yes		
E141B	1.130		Yes		
E17R	1.157		Yes		
E48	0.925		Yes		
E92P	5.000		Yes		
E93D	5.272		Yes		Worse
E93P	0.925		Yes		

Contaminants and Wells	UCL	Standard (Enforcement Standard)	Exceed WI-ES Standard	Worse or Better?	Trend
E94	0.925		Yes		
E94P	0.925		Yes		
E95	0.925		Yes		
E95P	0.925		Yes		
EW-1	1.123		Yes		
EW-2	4.863		Yes		
EW-3	0.940		Yes		
MMSD-MANHOLE	1.000		Yes		
P64C	3.442		Yes		
P66C	0.925		Yes		
P67A	0.925		Yes		
PW09	0.925		Yes		
TW62	0.925		Yes		
TW65P	0.925		Yes		

Table 4b: Exceedences of WI Preventive Action Limit (PAL)

Constituent	Location	UCL	PAL	Exceed PAL	ES	Exceed ES
1,2-dichloroethane	E123B	0.565	0.5	Yes	5	
1,2-dichloroethane	E135A	0.789	0.5	Yes	5	
1,2-dichloroethane	E135B	0.565	0.5	Yes	5	
1,2-dichloroethane	E137A	1.452	0.5	Yes	5	
1,2-dichloroethane	E137B	0.861	0.5	Yes	5	
1,2-dichloroethane	E140	1.765	0.5	Yes	5	
1,2-dichloroethane	E141A	0.628	0.5	Yes	5	
1,2-dichloroethane	E141B	0.565	0.5	Yes	5	
1,2-dichloroethane	E17R	0.565	0.5	Yes	5	
1,2-dichloroethane	E48	0.565	0.5	Yes	5	
1,2-dichloroethane	E92P	2.5	0.5	Yes	5	
1,2-dichloroethane	E93D	0.565	0.5	Yes	5	
1,2-dichloroethane	E93P	0.565	0.5	Yes	5	
1,2-dichloroethane	E94	2.275	0.5	Yes	5	
1,2-dichloroethane	E94P	0.565	0.5	Yes	5	
1,2-dichloroethane	E95	0.565	0.5	Yes	5	
1,2-dichloroethane	E95P	0.565	0.5	Yes	5	
1,2-dichloroethane	EW-1	2.863	0.5	Yes	5	
1,2-dichloroethane	EW-2	2.209	0.5	Yes	5	
1,2-dichloroethane	EW-3	1.394	0.5	Yes	5	
1,2-dichloroethane	MMSD-MANHOLE	0.919	0.5	Yes	5	
1,2-dichloroethane	P64C	0.565	0.5	Yes	5	
1,2-dichloroethane	P66C	0.565	0.5	Yes	5	
1,2-dichloroethane	P67A	0.565	0.5	Yes	5	
1,2-dichloroethane	PW09	0.565	0.5	Yes	5	
1,2-dichloroethane	PW09	0.565	0.5	Yes	5	
1,2-dichloroethane	TW62	0.565	0.5	Yes	5	
1,2-dichloroethane	TW65P	0.565	0.5	Yes	5	
1,2-dichloropropane	E123B	2.5	0.5	Yes	5	

Constituent	Location	UCL	PAL	Exceed PAL	ES	Exceed ES
1,2-dichloropropane	E135A	2.871	0.5	Yes	5	
1,2-dichloropropane	E135B	2.848	0.5	Yes	5	
1,2-dichloropropane	E137A	3.207	0.5	Yes	5	
1,2-dichloropropane	E137B	3.323	0.5	Yes	5	
1,2-dichloropropane	E140	2.5	0.5	Yes	5	
1,2-dichloropropane	E141A	2.034	0.5	Yes	5	
1,2-dichloropropane	E141B	3.268	0.5	Yes	5	
1,2-dichloropropane	E17R	2.5	0.5	Yes	5	
1,2-dichloropropane	E48	2.5	0.5	Yes	5	
1,2-dichloropropane	E92P	2.5	0.5	Yes	5	
1,2-dichloropropane	E93D	2.5	0.5	Yes	5	
1,2-dichloropropane	E93P	2.5	0.5	Yes	5	
1,2-dichloropropane	E94	2.5	0.5	Yes	5	
1,2-dichloropropane	E94P	2.5	0.5	Yes	5	
1,2-dichloropropane	E95	2.5	0.5	Yes	5	
1,2-dichloropropane	E95P	2.5	0.5	Yes	5	
1,2-dichloropropane	EW-1	2.892	0.5	Yes	5	
1,2-dichloropropane	EW-2	2.178	0.5	Yes	5	
1,2-dichloropropane	EW-3	0.86	0.5	Yes	5	
1,2-dichloropropane	MMSD-MANHOLE	2.5	0.5	Yes	5	
1,2-dichloropropane	P64C	2.5	0.5	Yes	5	
1,2-dichloropropane	P66C	2.5	0.5	Yes	5	
1,2-dichloropropane	P67A	2.5	0.5	Yes	5	
1,2-dichloropropane	PW09	2.5	0.5	Yes	5	
1,2-dichloropropane	PW09	2.5	0.5	Yes	5	
1,2-dichloropropane	TW62	2.5	0.5	Yes	5	
1,2-dichloropropane	TW65P	2.5	0.5	Yes	5	
Benzene	E123B	0.725	0.5	Yes	5	
Benzene	E135A	0.789	0.5	Yes	5	
Benzene	E135B	0.899	0.5	Yes	5	
Benzene	E137A	0.804	0.5	Yes	5	
Benzene	E137B	0.949	0.5	Yes	5	
Benzene	E140	13.582	0.5	Yes	5	Yes
Benzene	E141A	0.687	0.5	Yes	5	
Benzene	E141B	0.725	0.5	Yes	5	
Benzene	E17R	0.725	0.5	Yes	5	
Benzene	E48	0.725	0.5	Yes	5	
Benzene	E92P	2.5	0.5	Yes	5	
Benzene	E93D	0.725	0.5	Yes	5	
Benzene	E93P	0.725	0.5	Yes	5	
Benzene	E94	2.297	0.5	Yes	5	
Benzene	E94P	0.725	0.5	Yes	5	
Benzene	E95	0.725	0.5	Yes	5	
Benzene	E95P	0.725	0.5	Yes	5	
Benzene	EW-1	6.743	0.5	Yes	5	Yes
Benzene	EW-2	3.689	0.5	Yes	5	
Benzene	EW-3	1.639	0.5	Yes	5	
Benzene	MMSD-MANHOLE	3.814	0.5	Yes	5	
Benzene	P64C	0.725	0.5	Yes	5	
Benzene	P66C	0.725	0.5	Yes	5	
Benzene	P67A	0.725	0.5	Yes	5	
Benzene	PW09	0.725	0.5	Yes	5	

Constituent	Location	UCL	PAL	Exceed PAL	ES	Exceed ES
Benzene	PW09	0.725	0.5	Yes	5	
Benzene	TW62	0.725	0.5	Yes	5	
Benzene	TW65P	0.725	0.5	Yes	5	
Chromium	NE Riser 2	1042.653	10	Yes	100	Yes
Chromium	P68(TW68)	74.858	10	Yes	100	
Chromium	PW-N	12.705	10	Yes	100	
Chromium	SE Riser 3	78.195	10	Yes	100	
Chromium	TW-77	1336.915	10	Yes	100	Yes
Chromium, dissolved	E94P	153.785	10	Yes	100	Yes
Chromium, dissolved	P68(TW68)	38.571	10	Yes	100	
Chromium, total , dissolved	P68 (TW68)	38.571	10	Yes	100	
Lead	NE Riser 2	3010.81	1.5	Yes	15	Yes
Lead	P68 (TW68)	86.572	1.5	Yes	15	Yes
Lead	PW01	10.867	1.5	Yes	15	
Lead	PW02	5.434	1.5	Yes	15	
Lead	PW04	9.191	1.5	Yes	15	
Lead	PW06	57.688	1.5	Yes	15	Yes
Lead	PW08	2.5	1.5	Yes	15	
Lead	PW09	7.149	1.5	Yes	15	
Lead	PW09	7.149	1.5	Yes	15	
Lead	PW10	14.737	1.5	Yes	15	
Lead	PW11	11.301	1.5	Yes	15	
Lead	PW12	2.5	1.5	Yes	15	
Lead	PW20	6.272	1.5	Yes	15	
Lead	PW21	10.164	1.5	Yes	15	
Lead	PW22	16.104	1.5	Yes	15	Yes
Lead	PW-A	5.098	1.5	Yes	15	
Lead	PW-C	7.696	1.5	Yes	15	
Lead	PW-D	2.5	1.5	Yes	15	
Lead	PW-E	5.434	1.5	Yes	15	
Lead	PW-F	15.491	1.5	Yes	15	Yes
Lead	PW-G	2.5	1.5	Yes	15	
Lead	PW-I	2.5	1.5	Yes	15	
Lead	PW-J	2.5	1.5	Yes	15	
Lead	PW-M	2.645	1.5	Yes	15	
Lead	PW-N	2.5	1.5	Yes	15	
Lead	PW-THIELE	8.4	1.5	Yes	15	
Lead	PW-VITRANO	2.701	1.5	Yes	15	
Lead	PWWMI	4.847	1.5	Yes	15	
Lead	SE Riser 3	78.195	1.5	Yes	15	Yes
Lead	TW-77	5256.31	1.5	Yes	15	Yes
Lead , dissolved	E48	2.5	1.5	Yes	15	
Lead , dissolved	P68 (TW68)	136.427	1.5	Yes	15	Yes
Tetrachloroethylene(pce)	E123B	0.653	0.5	Yes	5	
Tetrachloroethylene(pce)	E135A	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E135B	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E137A	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E137B	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E140	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E141A	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E141B	2.255	0.5	Yes	5	
Tetrachloroethylene(pce)	E17R	0.91	0.5	Yes	5	

Constituent	Location	UCL	PAL	Exceed PAL	ES	Exceed ES
Tetrachloroethylene(pce)	E48	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E92P	2.5	0.5	Yes	5	
Tetrachloroethylene(pce)	E93D	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E93P	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E94	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E94P	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E95	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	E95P	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	EW-1	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	EW-2	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	EW-3	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	MMSD-MANHOLE	1	0.5	Yes	5	
Tetrachloroethylene(pce)	P64C	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	P66C	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	P67A	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	PW09	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	PW09	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	TW62	0.91	0.5	Yes	5	
Tetrachloroethylene(pce)	TW65P	0.91	0.5	Yes	5	
Trichloroethylene	E135A	0.631	0.5	Yes	5	
Trichloroethylene	E135B	0.615	0.5	Yes	5	
Trichloroethylene	E137A	0.562	0.5	Yes	5	
Trichloroethylene	E137B	0.759	0.5	Yes	5	
Trichloroethylene	E140	1.815	0.5	Yes	5	
Trichloroethylene	E141A	3.146	0.5	Yes	5	
Trichloroethylene	E141B	0.789	0.5	Yes	5	
Trichloroethylene	E17R	0.705	0.5	Yes	5	
Trichloroethylene	E48	0.58	0.5	Yes	5	
Trichloroethylene	E92P	2.5	0.5	Yes	5	
Trichloroethylene	E93D	0.58	0.5	Yes	5	
Trichloroethylene	E93P	0.58	0.5	Yes	5	
Trichloroethylene	E94	0.639	0.5	Yes	5	
Trichloroethylene	E94P	0.58	0.5	Yes	5	
Trichloroethylene	E95	0.58	0.5	Yes	5	
Trichloroethylene	E95P	0.58	0.5	Yes	5	
Trichloroethylene	EW-1	0.6	0.5	Yes	5	
Trichloroethylene	EW-2	2.899	0.5	Yes	5	
Trichloroethylene	EW-3	0.756	0.5	Yes	5	
Trichloroethylene	P64C	0.58	0.5	Yes	5	
Trichloroethylene	P66C	0.58	0.5	Yes	5	
Trichloroethylene	P67A	0.58	0.5	Yes	5	
Trichloroethylene	PW09	0.58	0.5	Yes	5	
Trichloroethylene	PW09	0.58	0.5	Yes	5	
Trichloroethylene	TW62	0.58	0.5	Yes	5	
Trichloroethylene	TW65P	0.58	0.5	Yes	5	
Vinyl chloride	E123B	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	E135A	1.021	0.02	Yes	0.2	Yes
Vinyl chloride	E135B	1.133	0.02	Yes	0.2	Yes
Vinyl chloride	E137A	1.023	0.02	Yes	0.2	Yes
Vinyl chloride	E137B	2.179	0.02	Yes	0.2	Yes
Vinyl chloride	E140	1.052	0.02	Yes	0.2	Yes
Vinyl chloride	E141A	2.464	0.02	Yes	0.2	Yes

Constituent	Location	UCL	PAL	Exceed PAL	ES	Exceed ES
Vinyl chloride	E141B	1.13	0.02	Yes	0.2	Yes
Vinyl chloride	E17R	1.157	0.02	Yes	0.2	Yes
Vinyl chloride	E48	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	E92P	5	0.02	Yes	0.2	Yes
Vinyl chloride	E93D	5.272	0.02	Yes	0.2	Yes
Vinyl chloride	E93P	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	E94	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	E94P	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	E95	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	E95P	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	EW-1	1.123	0.02	Yes	0.2	Yes
Vinyl chloride	EW-2	4.863	0.02	Yes	0.2	Yes
Vinyl chloride	EW-3	0.94	0.02	Yes	0.2	Yes
Vinyl chloride	MMSD-MANHOLE	1	0.02	Yes	0.2	Yes
Vinyl chloride	P64C	3.442	0.02	Yes	0.2	Yes
Vinyl chloride	P66C	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	P67A	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	PW09	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	TW62	0.925	0.02	Yes	0.2	Yes
Vinyl chloride	TW65P	0.925	0.02	Yes	0.2	Yes

Table 5: Summary of Results

Well	1,2-Dichloro-ethane	1,2-Dichloro-propane	Benzene	Chromium	Chromium, dissolved	Lead	Lead, dissolved	Tetra-chloro-ethylene	Trichloro-ethylene	Vinyl Chloride
E123B								B ↓	B ↓	✓
E135A										✓
E135B									B ↓	✓
E137A	B								B ↓	✓
E137B										✓
E140			✓							✓
E141A		B ↓		↓					B	✓
E141B										✓
E17R										✓
E48										✓
E92P										✓
E93D										✓ W
E93P										✓
E94										✓
E94P										✓
E95										✓
E95P										✓
EW-1			✓ B		✓					✓
EW-2		↓								✓
EW-3										✓
FIELD BLANK						B				✓
MMSD-MANHOLE										✓
NE RISER 2				✓ B ↓		✓				
P64C										✓
P66C										✓
P67A										✓
P68 (TW68)						✓	✓			
PW-F						✓				
PW-H						B				

Well	1,2-Dichloro-ethane			1,2-Dichloro-propane			Benzene			Chromium			Chromium, dissolved			Lead			Lead, dissolved			Tetra-chloro-ethylene			Trichloro-ethylene			Vinyl Chloride		
PW06																	✓													
PW09																													✓	
PW22																	✓													
SE RISER 3																	✓													
TW-77										✓							✓													
TW62																													✓	
TW65P																													✓	

- ✓ UCL Exceeded the WIES standard. ↓ Decreasing trend (Sen's test) ↑ Increasing trend (Sen's test)
 W Worse – the most recent sample exceeded the baseline UPL for that well location (Comparison to Baseline test)
 B Better - the most recent sample was below the baseline LPL for that well location (Comparison to Baseline test)

CONCLUSIONS

This statistical analysis has used Comparison to Standard, Comparison to Baseline, and Sen's tests to look at the following eight contaminants of concern in the groundwater at the Muskego Sanitary Landfill:

- 1,2-dichloroethane
- 1,2-dichloropropane
- benzene
- chromium (including dissolved chromium)
- lead (including dissolved lead)
- tetrachloroethylene
- trichloroethylene
- vinyl chloride

Comparison to Standard

Comparison to WI Enforcement Standards (ES)

The following four contaminants of concern were not found to exceed the relevant clean-up standards in any of the sampling locations:

- 1,2-dichloroethane
- 1,2-dichloropropane
- tetrachloroethylene
- trichloroethylene

Based on the Comparison to Standard Test, the UCLs of the following four contaminants exceeded their clean-up standards as of 10/2003 in at least one sampling location:

- benzene
- chromium
- lead
- vinyl chloride

Exceedences for all four of the contaminants were, in many cases, several orders of magnitude greater than the clean-up standards. The most significant exceedence of a standard is with lead at well TW-77, followed in descending order by vinyl chloride at the E93D sampling location, vinyl chloride at the E92P sampling location, vinyl chloride at the EW-2 sampling location, and lead at the NE Riser 2 sampling location.

Comparison to WI Preventive Action Limits (PAL)

The PALs are much lower than the ES and as a result all contaminants exceeded the PAL at number of locations. There are 205 exceedences of the PAL as compared with 40

exceedences of the ES. The PALs for many of contaminants were below the detection limits of the contaminants which resulted in exceedences even though the contaminant was undetected at a location. In order to compare the concentrations to the PALs the detection limits must be lowered to below the PAL, if possible.

Comparison to Baseline

Based on the Comparison to Baseline Test, contamination was found to be worse as of 10/2003 for vinyl chloride at sampling location E93D. For the following seven constituents, contamination was better as of 10/2003 in at least one sampling location:

- 1,2-dichloroethane
- 1,2-dichloropropane
- benzene
- chromium
- lead
- tetrachloroethylene
- trichloroethylene

Trend Analysis

Based on Sen's Test, the following five constituents had contamination that was decreasing as of 10/2003 in at least one well:

- 1,2-dichloropropane
- benzene
- chromium
- tetrachloroethylene
- trichloroethylene

No constituents had contamination that was increasing at any sampling location.

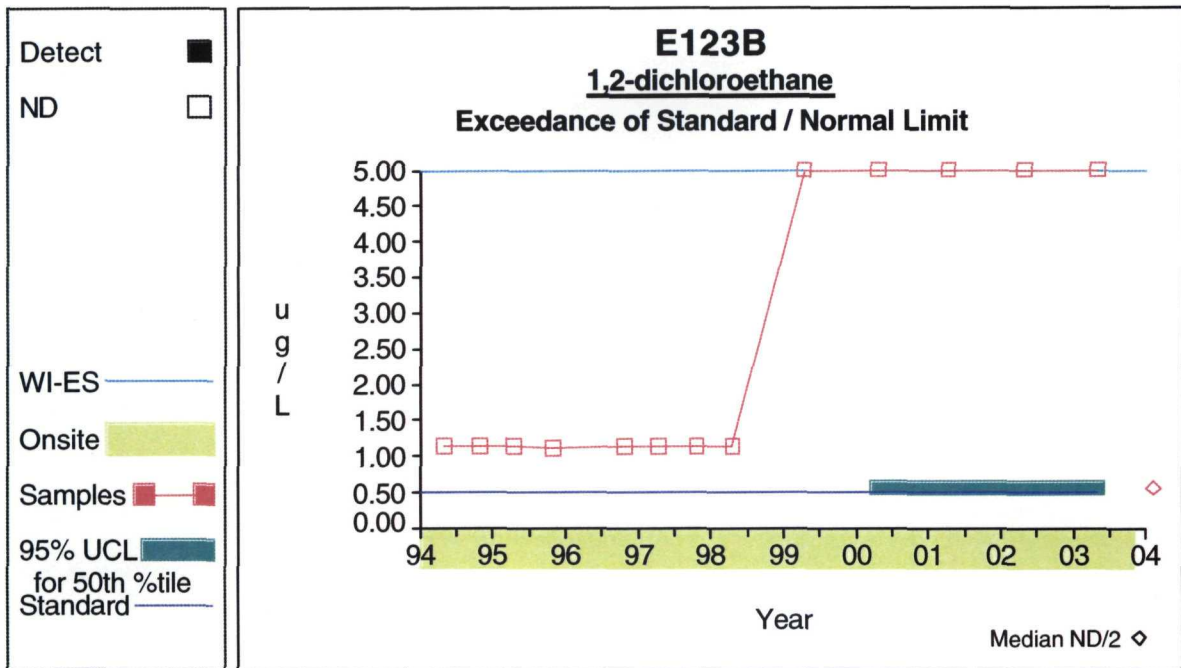
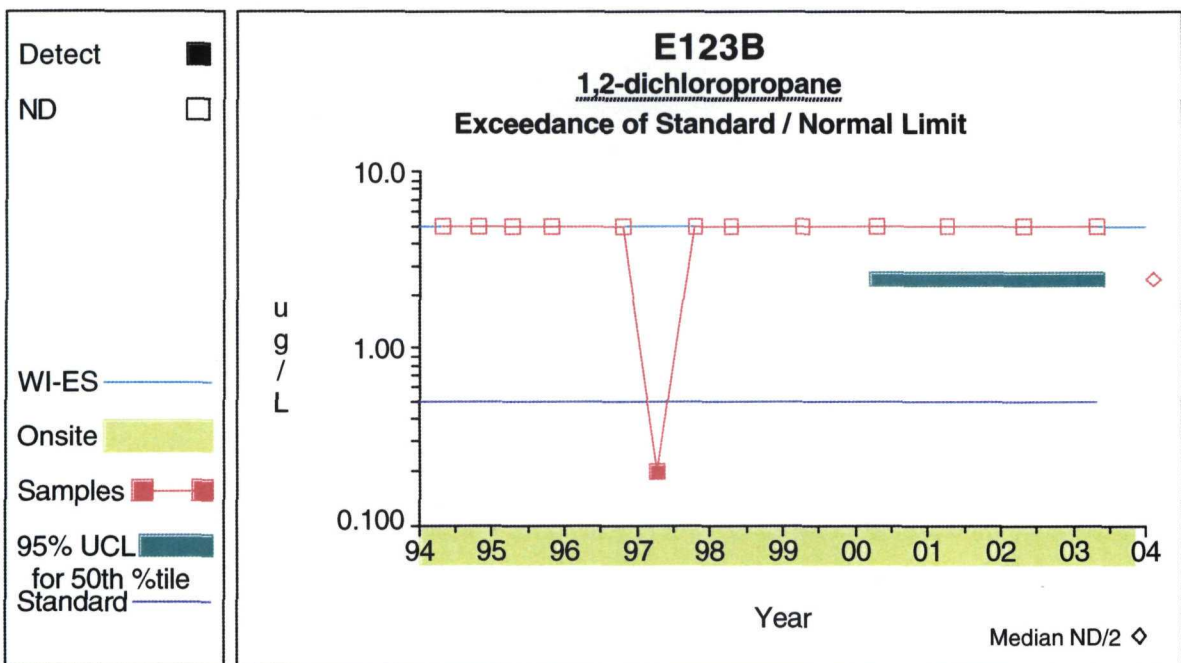
Remarks

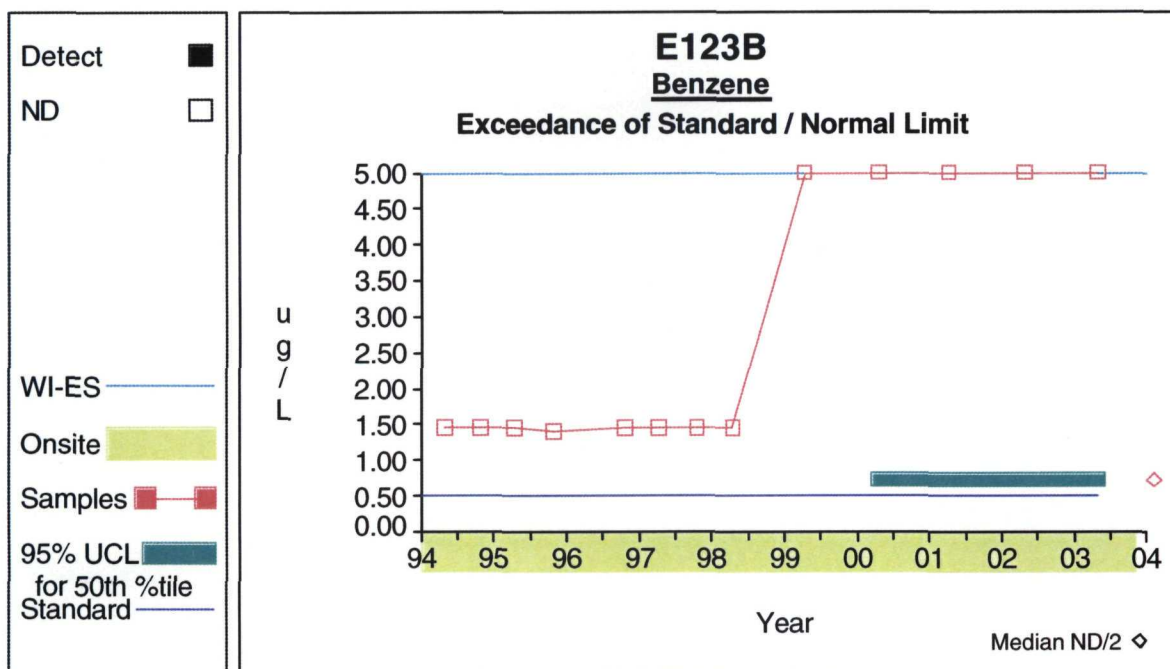
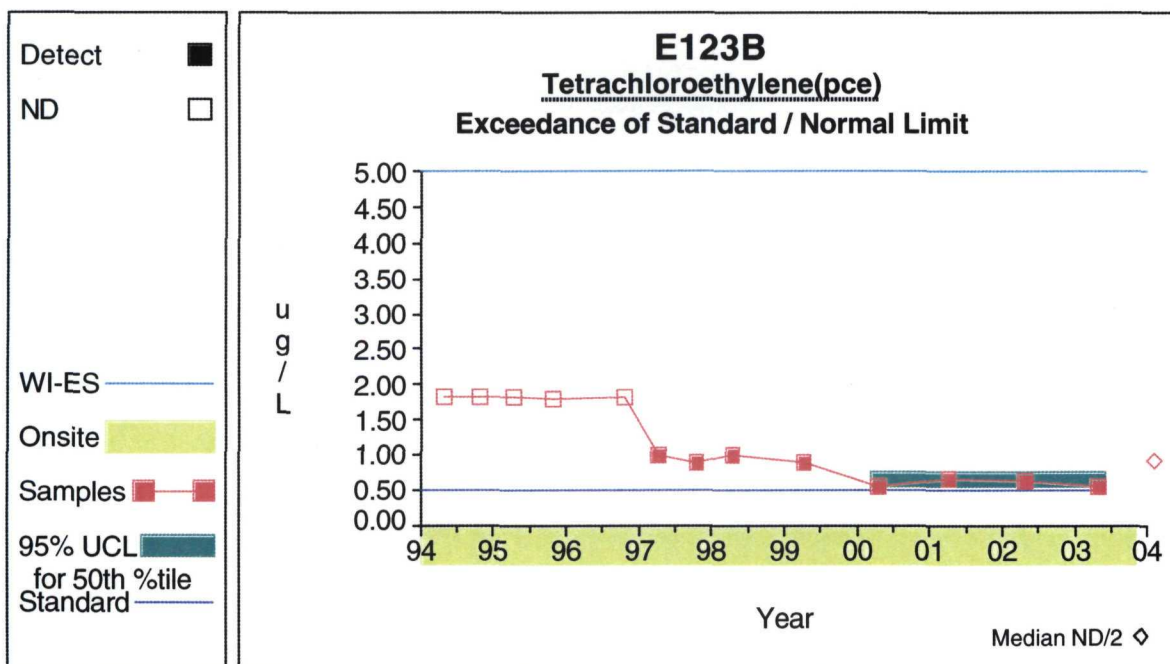
The results of the statistical analysis for the individual wells suggest that, while some clean-up standards are exceeded and significant contamination exists at the site, contamination is lessening in some cases. Only for vinyl chloride at sampling location E93D is contamination worsening.

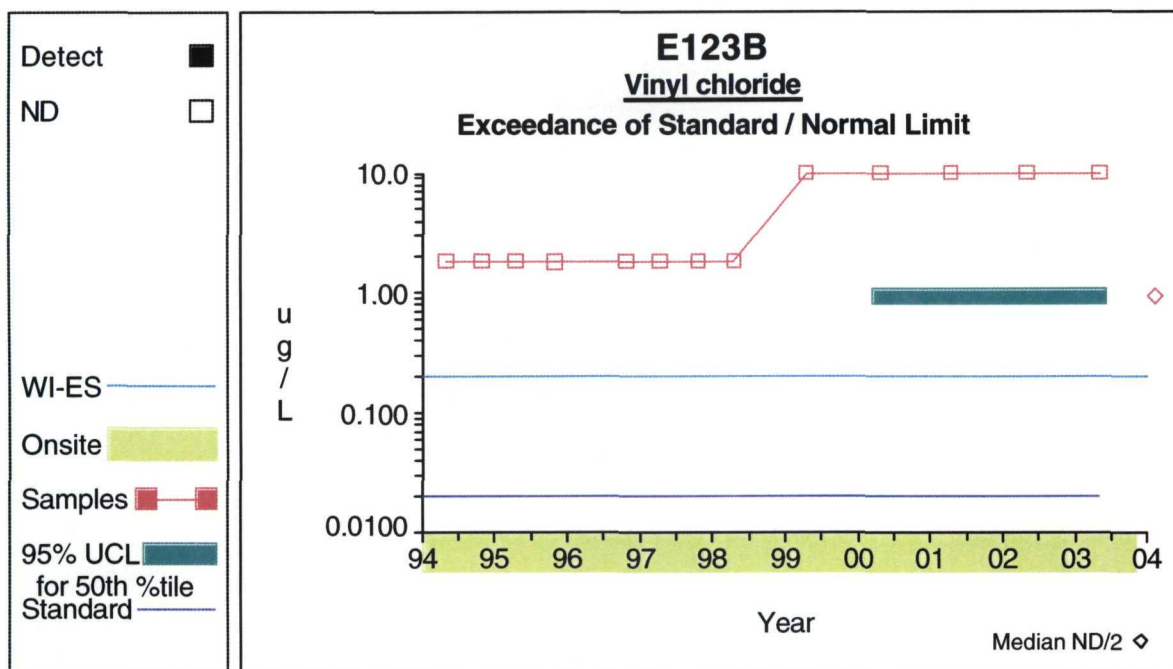
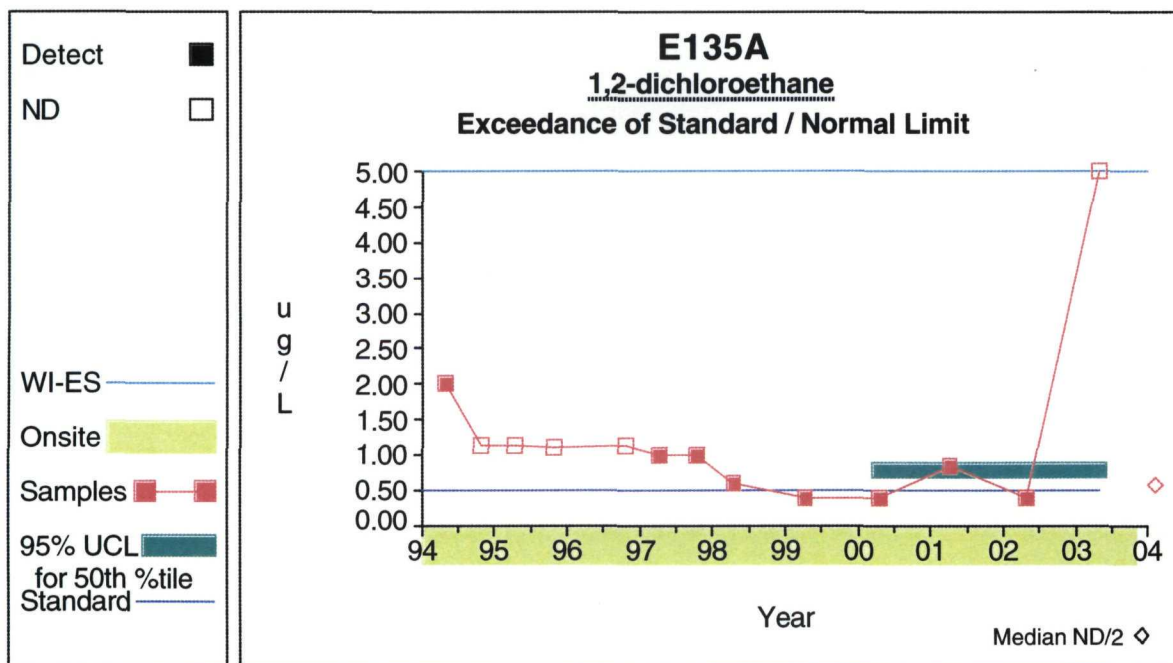
Four of the contaminants of concern (1,2-dichloroethane, 1,2-dichloropropane, tetrachloroethylene, and trichloroethylene) were not found to exceed the clean-up standards in any of the sampling locations. In addition, no increasing trends were identified for these contaminants, and the most recent samples were not above the baseline UPL (Upper Prediction Limit) for these contaminants. Provided the wells included in this analysis are located within the contaminant source area, there is evidence that these contaminants are below the clean-up criteria for the site and consideration can

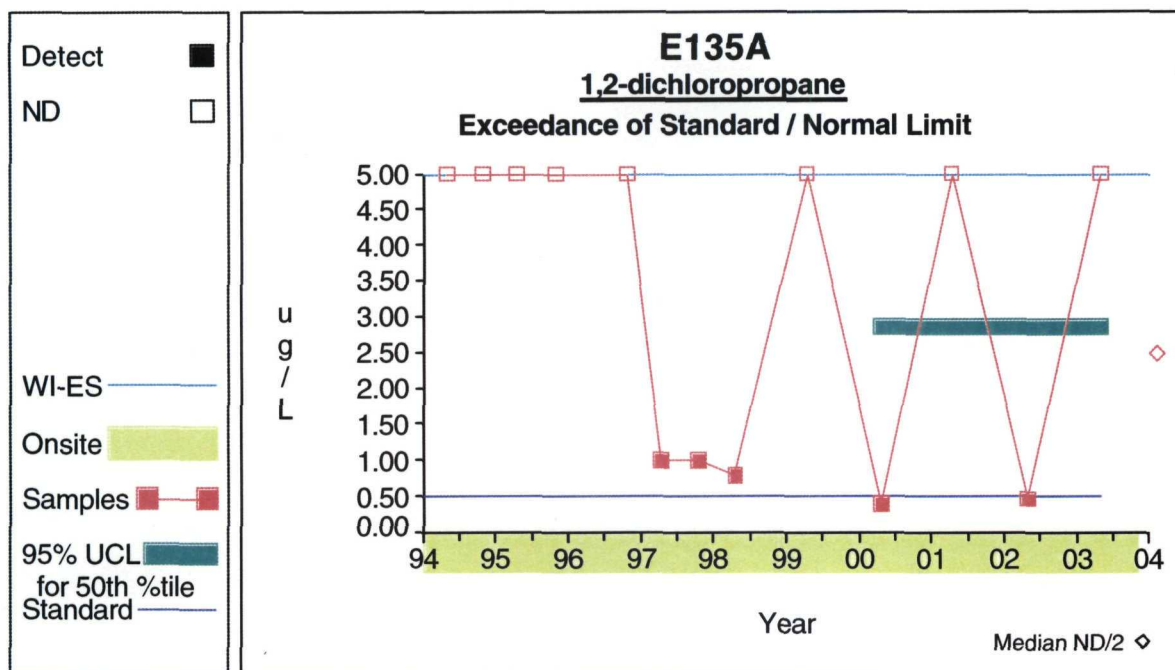
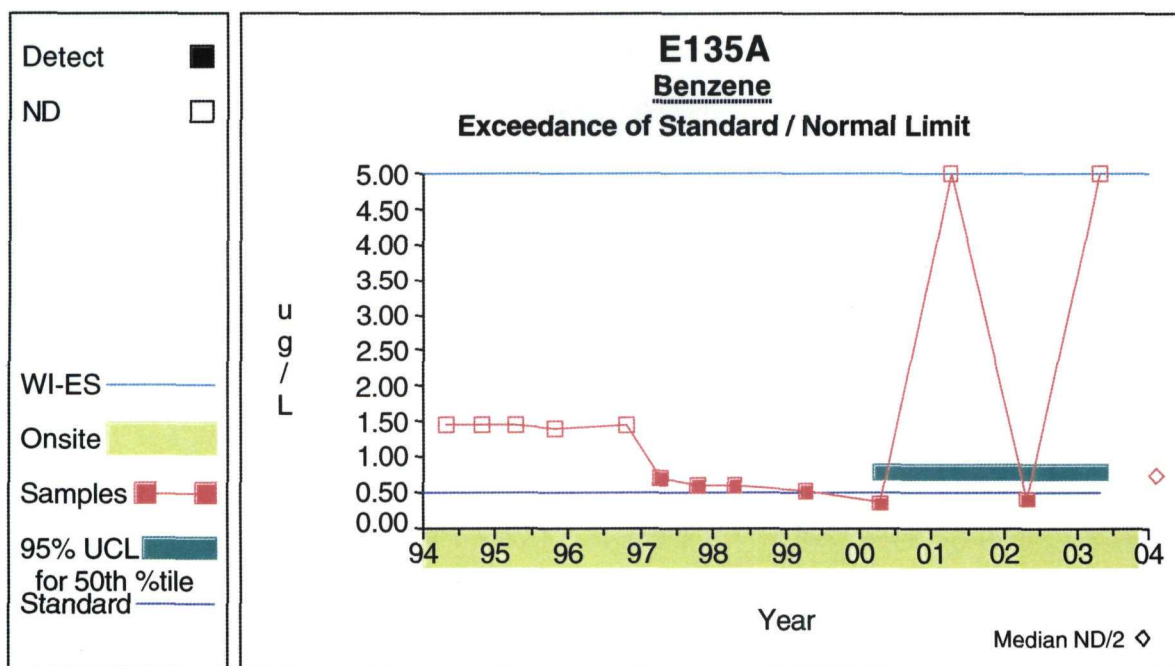
be given to reducing the frequency of monitoring for them. This presumes that none of the contaminants are degradation products of one of the other contaminants of concern.

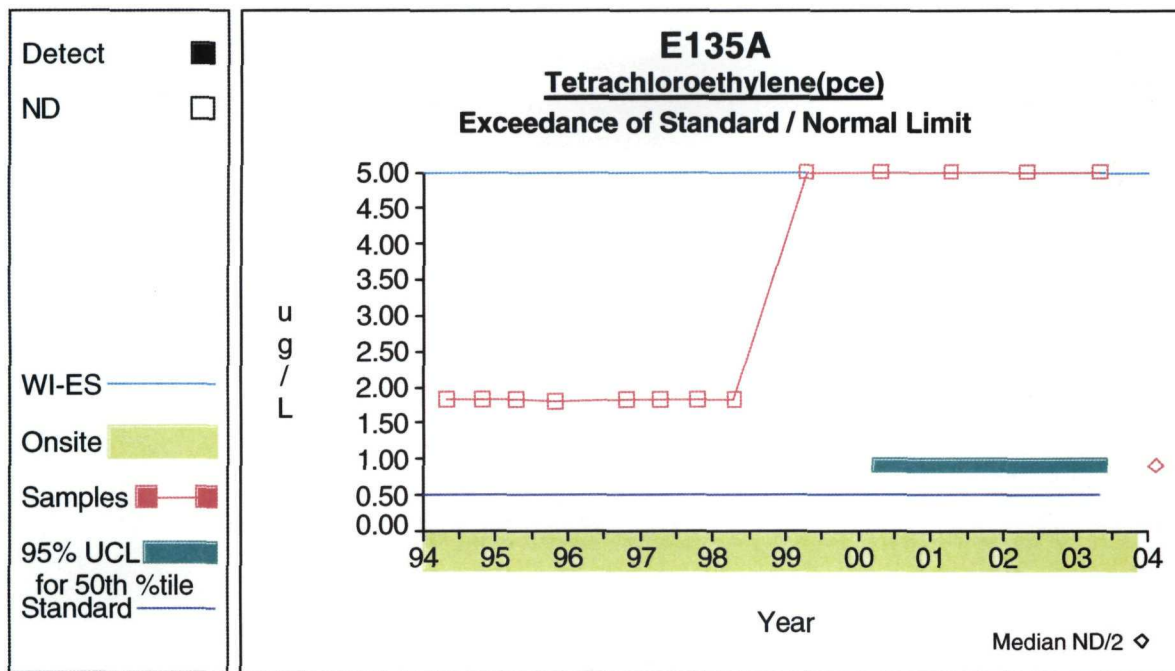
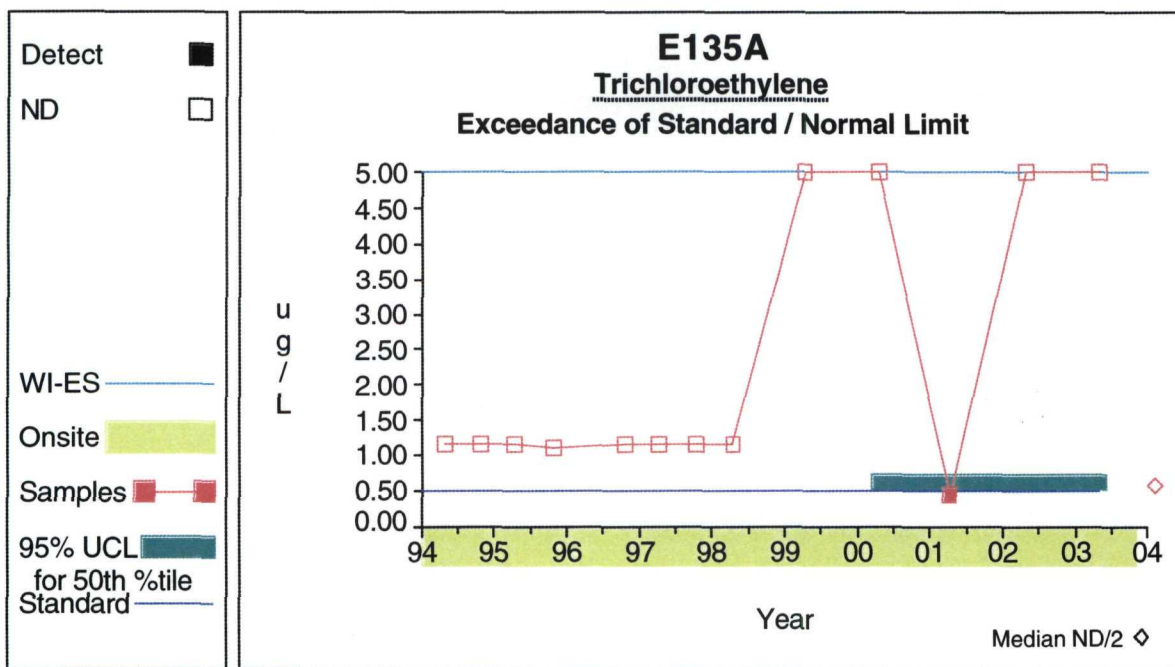
GRAPHS, TABLES AND WORKSHEETS

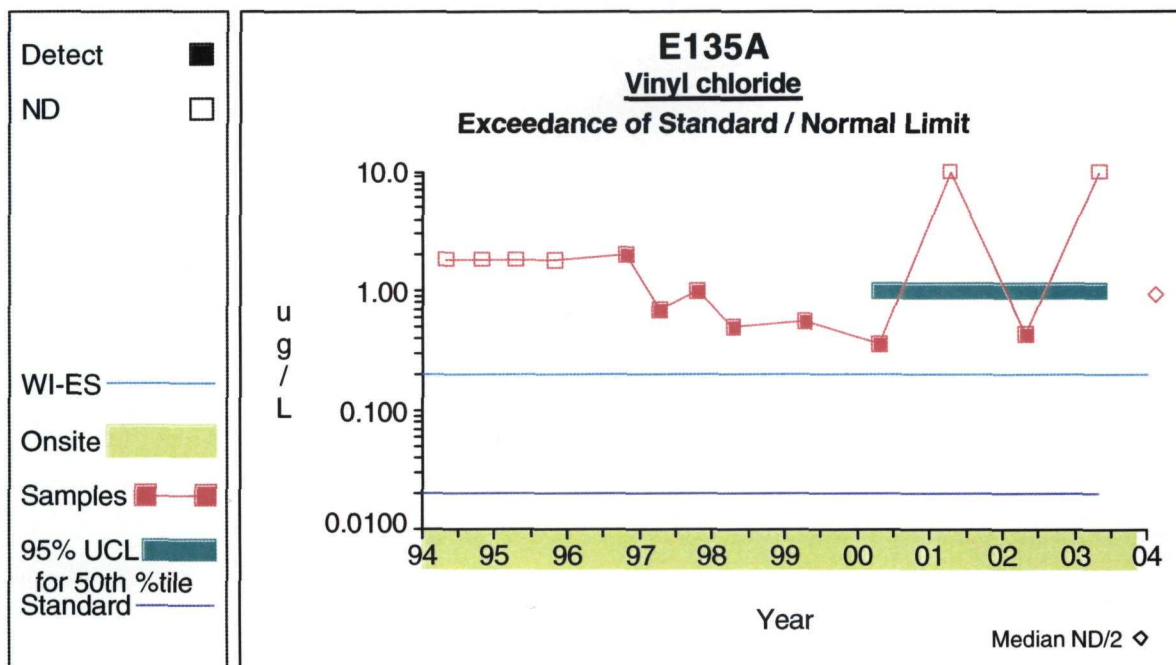
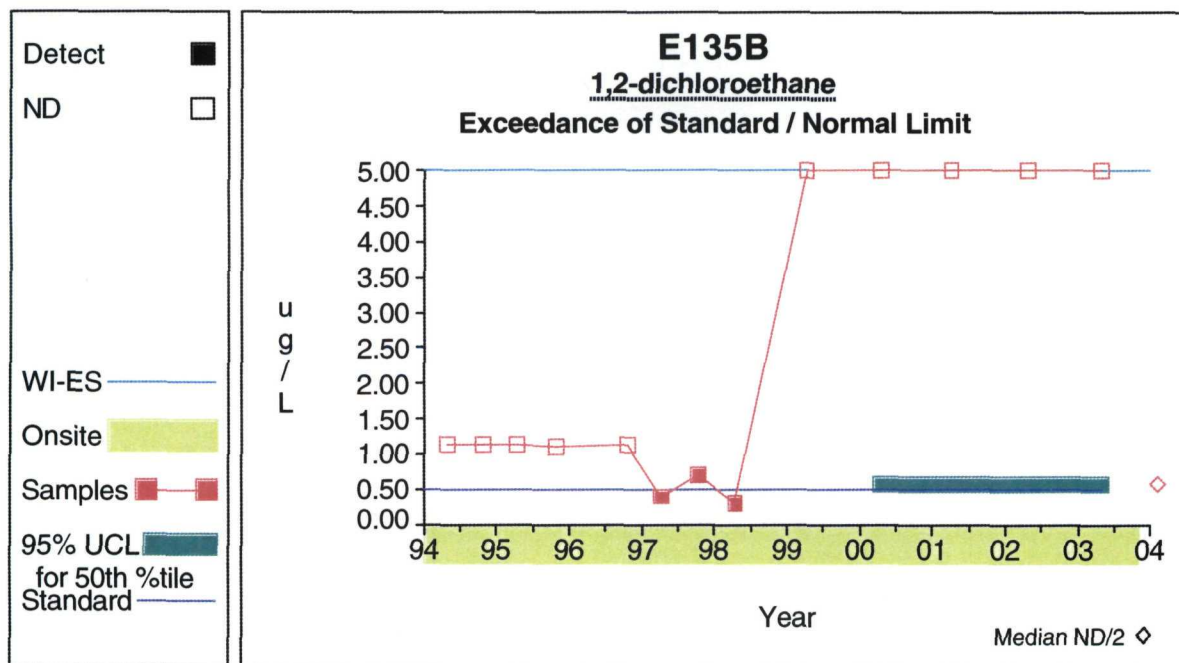
Comparison to Standard**Graph 1****Graph 2**

Comparison to Standard**Graph 3****Graph 8**

Comparison to Standard**Graph 10****Graph 11**

Comparison to Standard**Graph 12****Graph 13**

Comparison to Standard**Graph 18****Graph 19**

Comparison to Standard**Graph 20****Graph 21**

E135B
1,2-dichloropropane
Exceedance of Standard / Normal Limit

u g / L

Year

Median ND/2 ◇

Detect ■

ND □

WI-ES —

Onsite ■

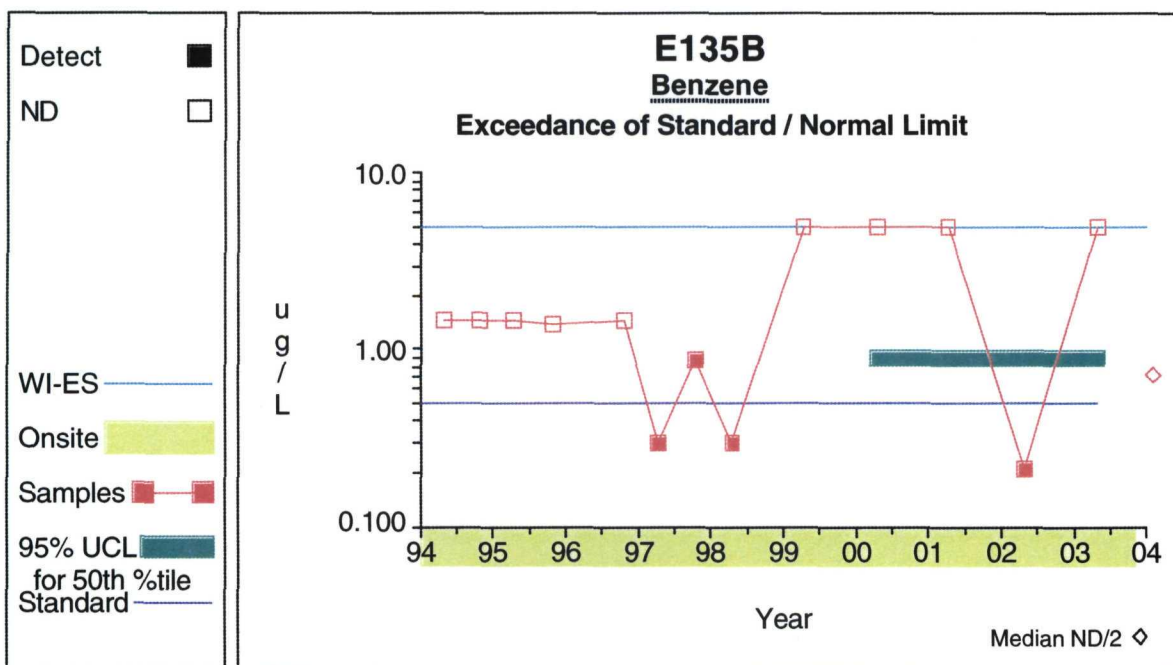
Samples ■—■

95% UCL for 50th %tile

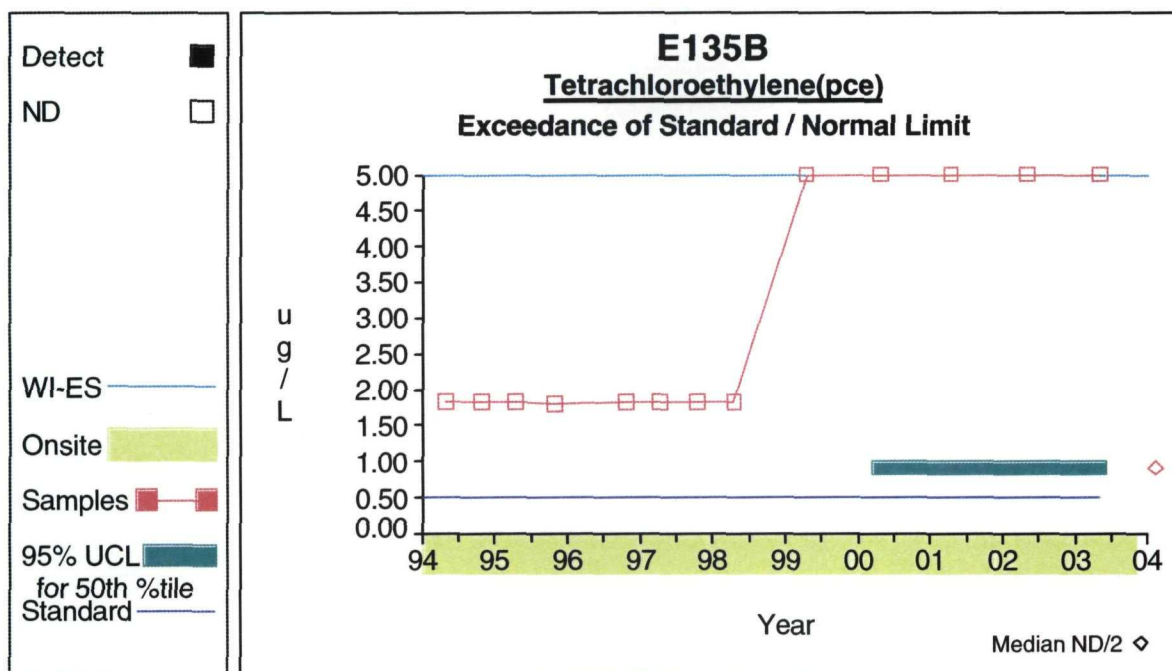
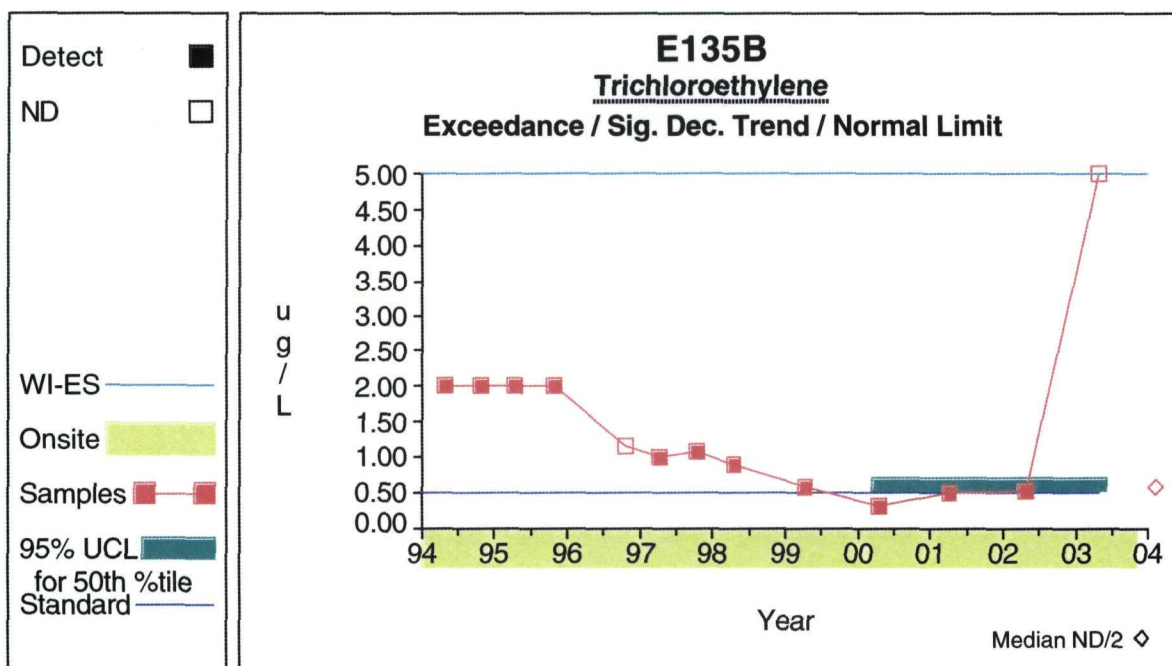
Standard —

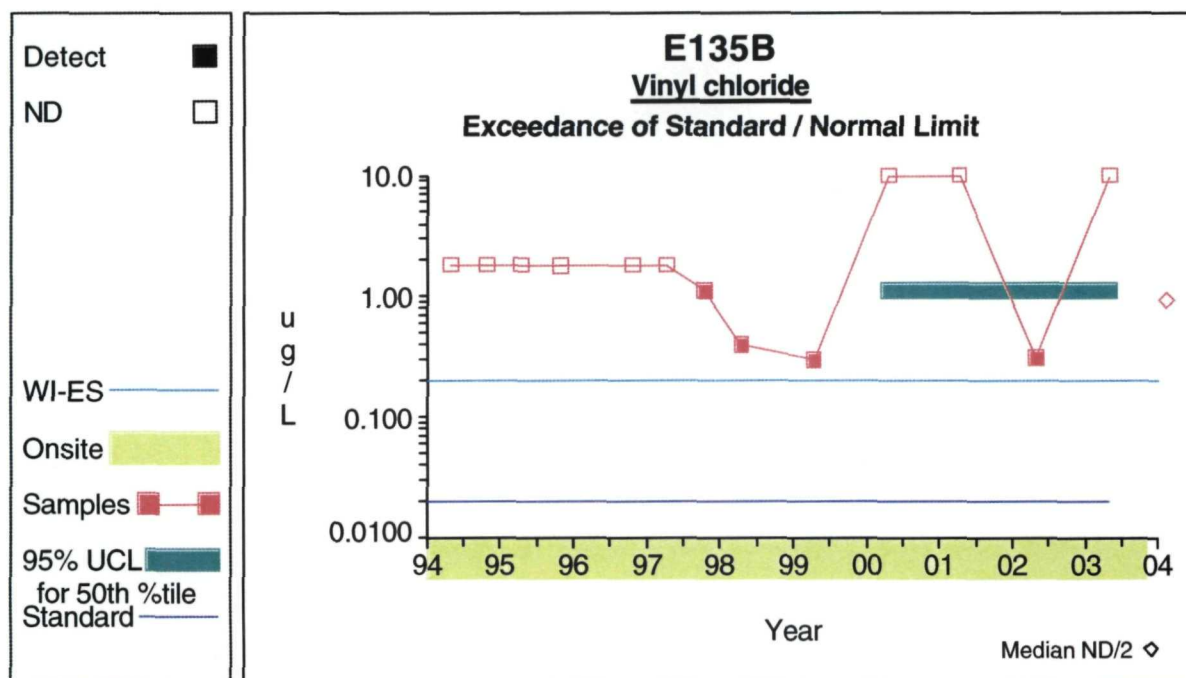
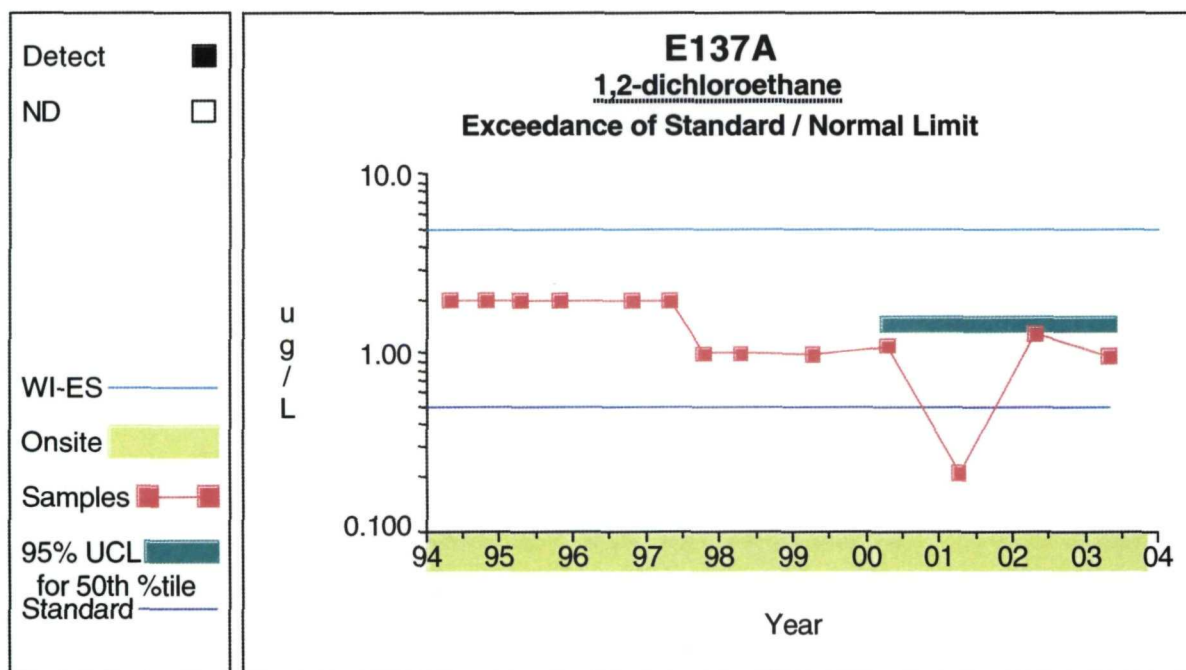
Year	Onsite (ug/L)	Samples (ug/L)
94	5.00	
95	5.00	
96	5.00	
97	5.00	1.00
98	5.00	3.00
99	5.00	1.00
00	5.00	
01	5.00	0.50
02		0.70
03	5.00	
04		

Graph 22



Graph 23

Comparison to Standard**Graph 28****Graph 29**

Comparison to Standard**Graph 30****Graph 31**

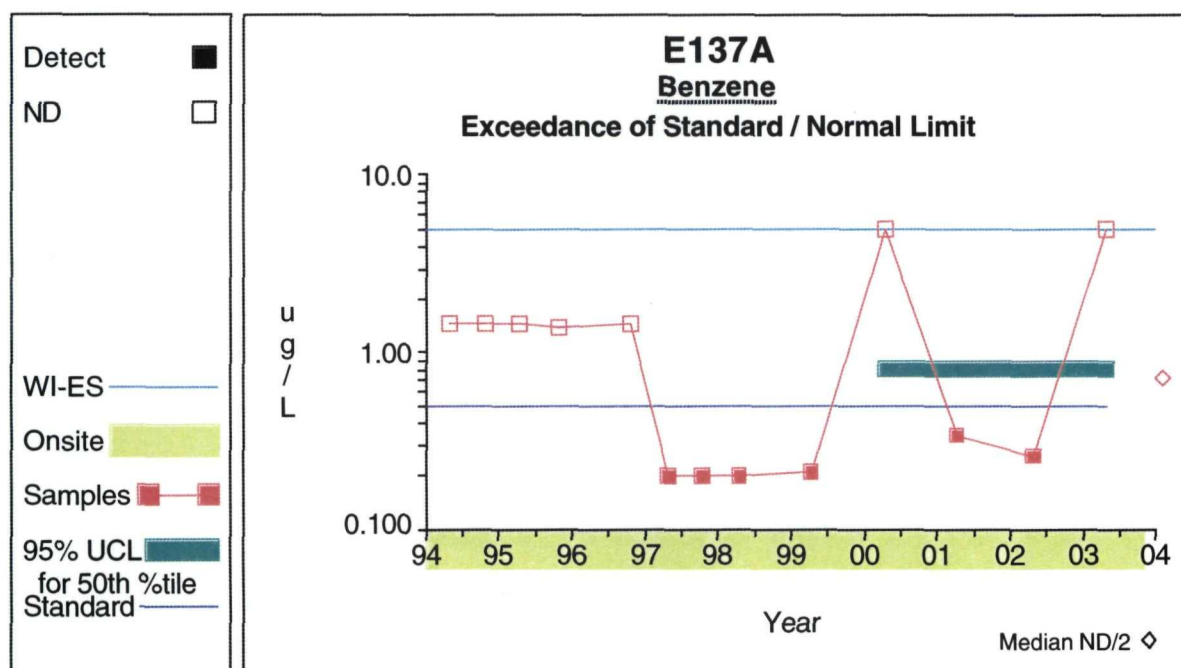
E137A
1,2-dichloropropane
Exceedance of Standard / Normal Limit

Year	Exceedance of Standard / Normal Limit	Median ND/2
94	0.00	
95	0.00	
96	0.00	
97	0.00	
97	0.25	
98	0.00	
98	0.25	
99	0.00	
00	0.00	0.75 - 0.85
01	0.00	0.75 - 0.85
02	0.00	0.75 - 0.85
02	0.25	
03	0.00	0.75 - 0.85
04	0.00	0.25

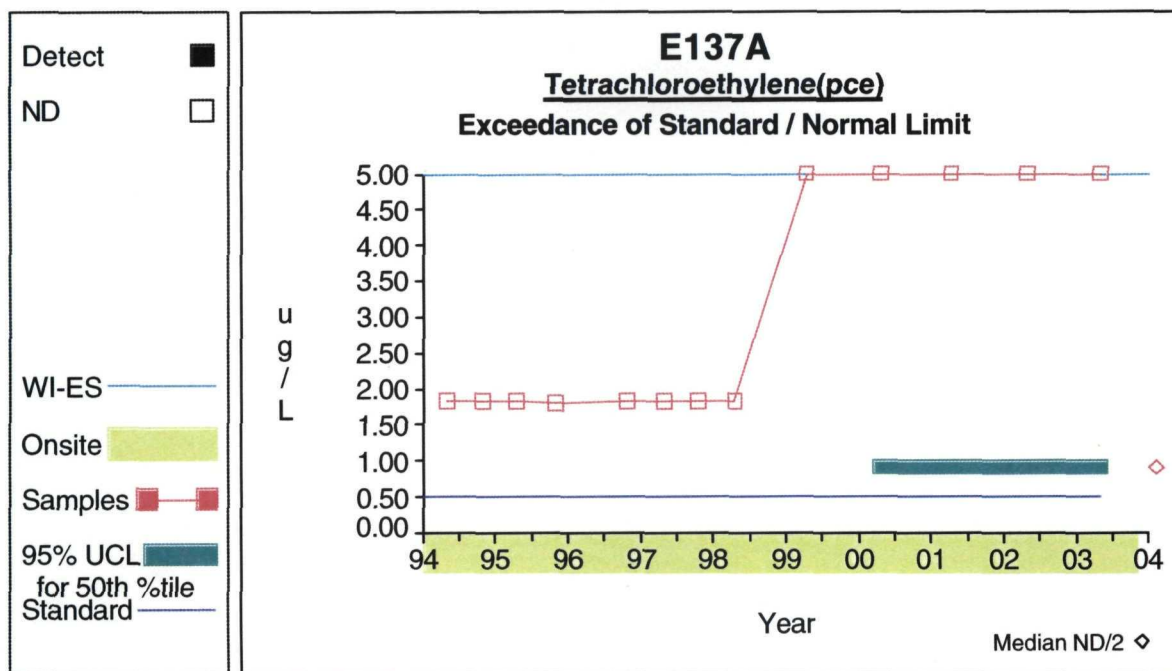
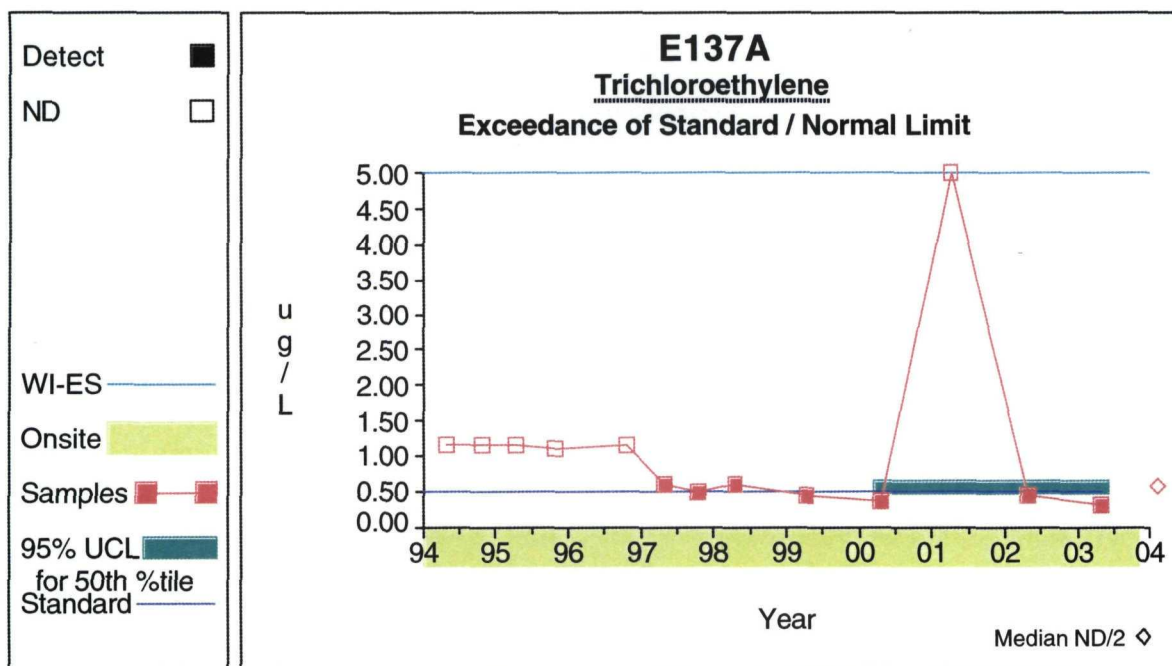
Year

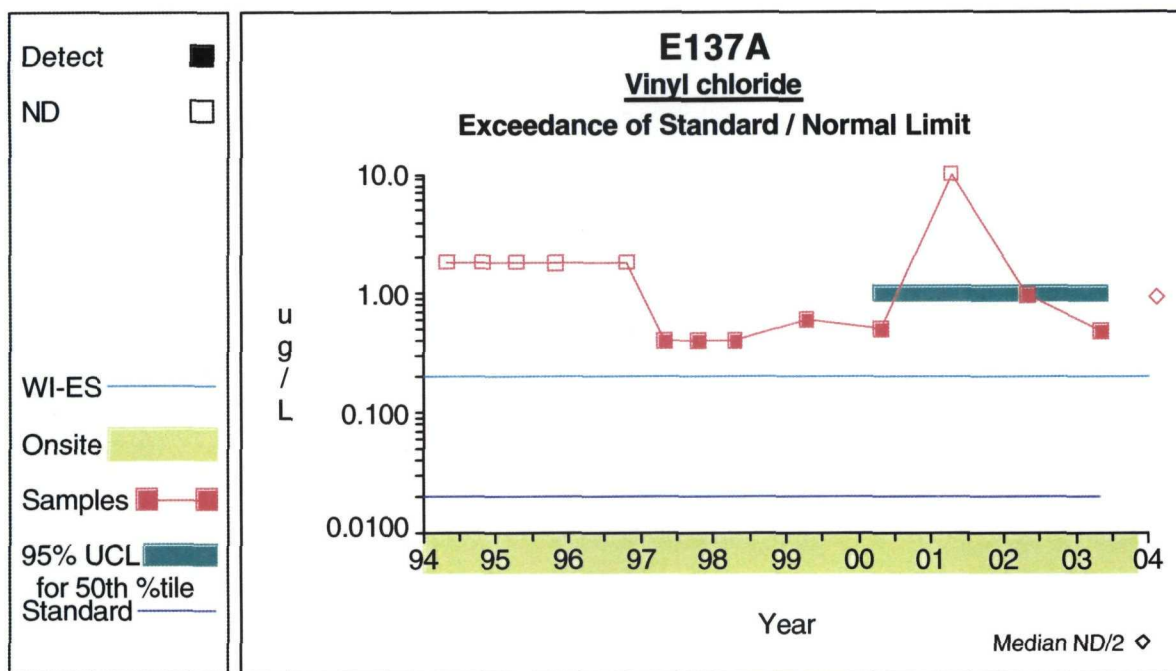
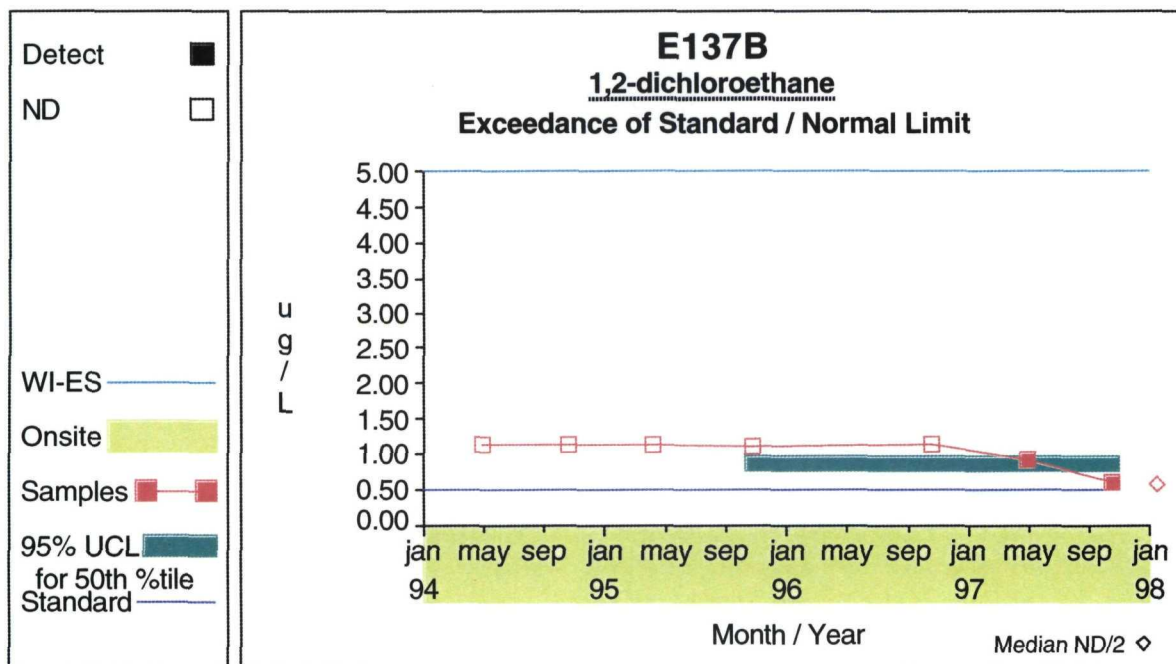
Median ND/2 ◇

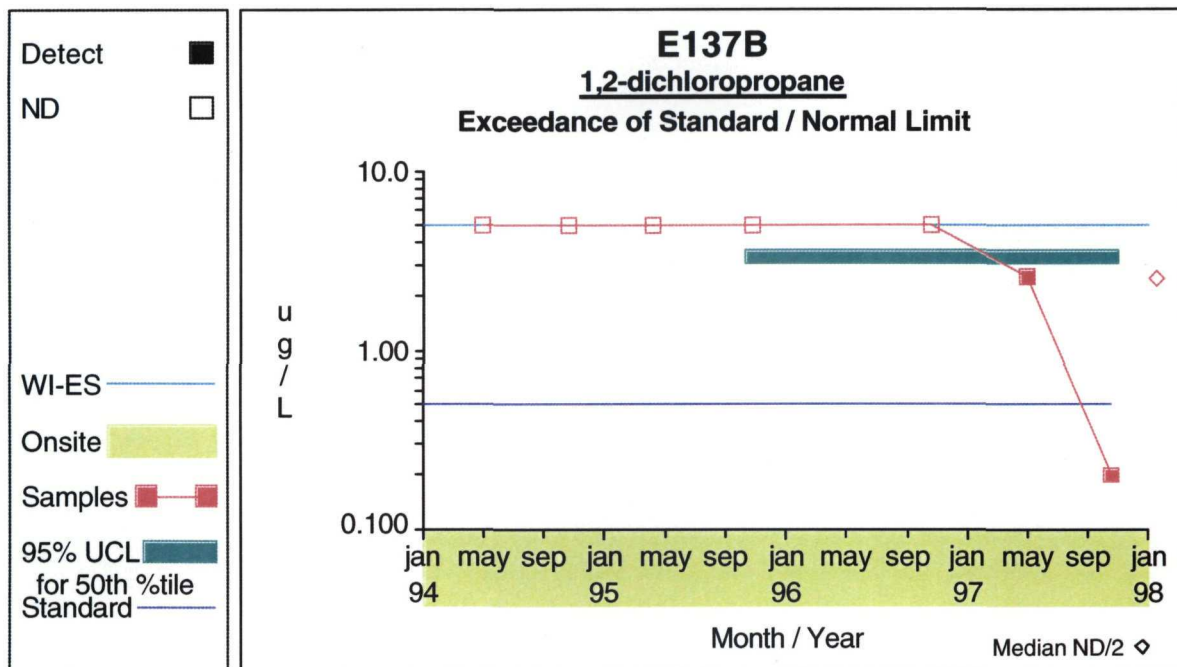
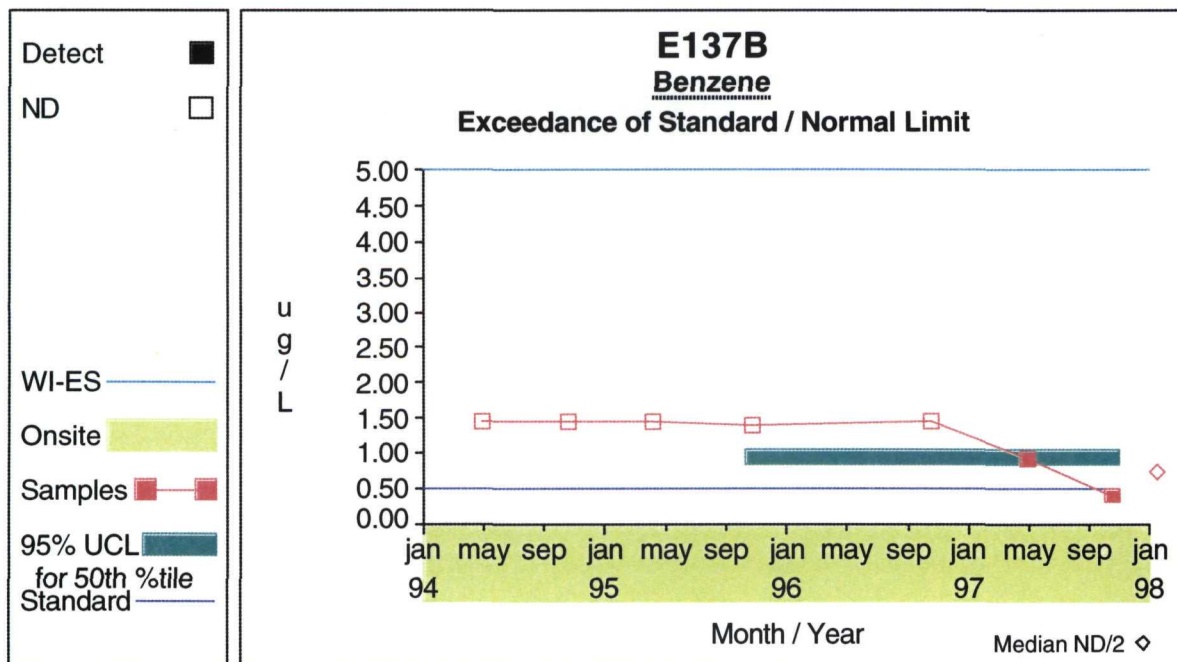
Graph 32

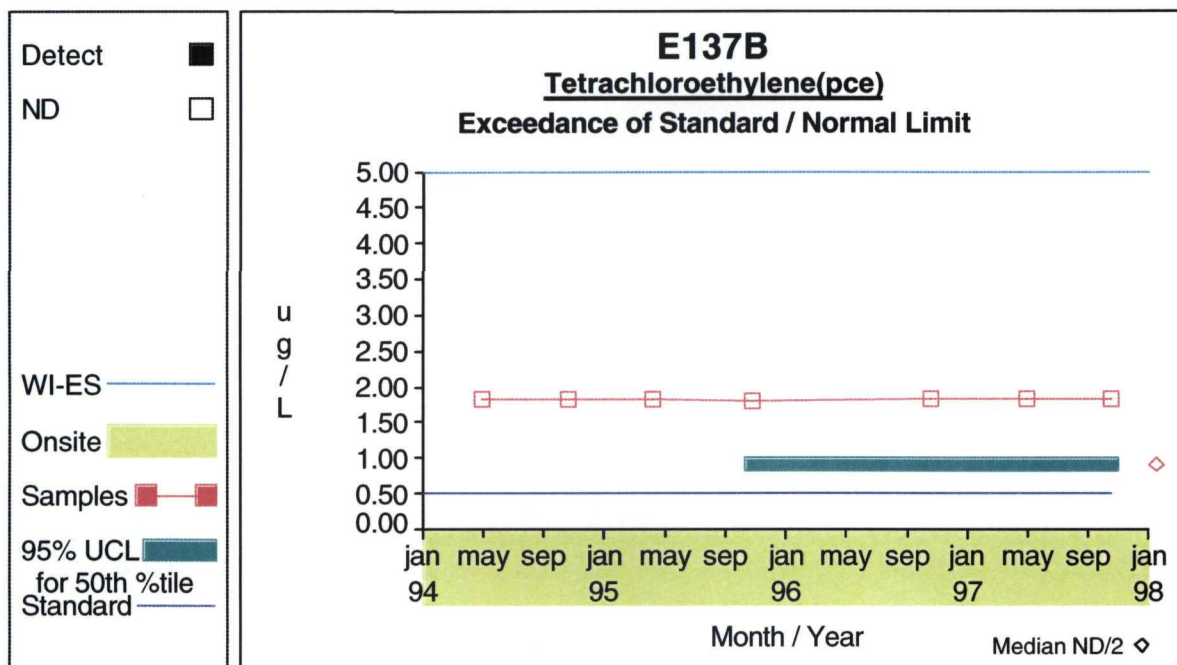
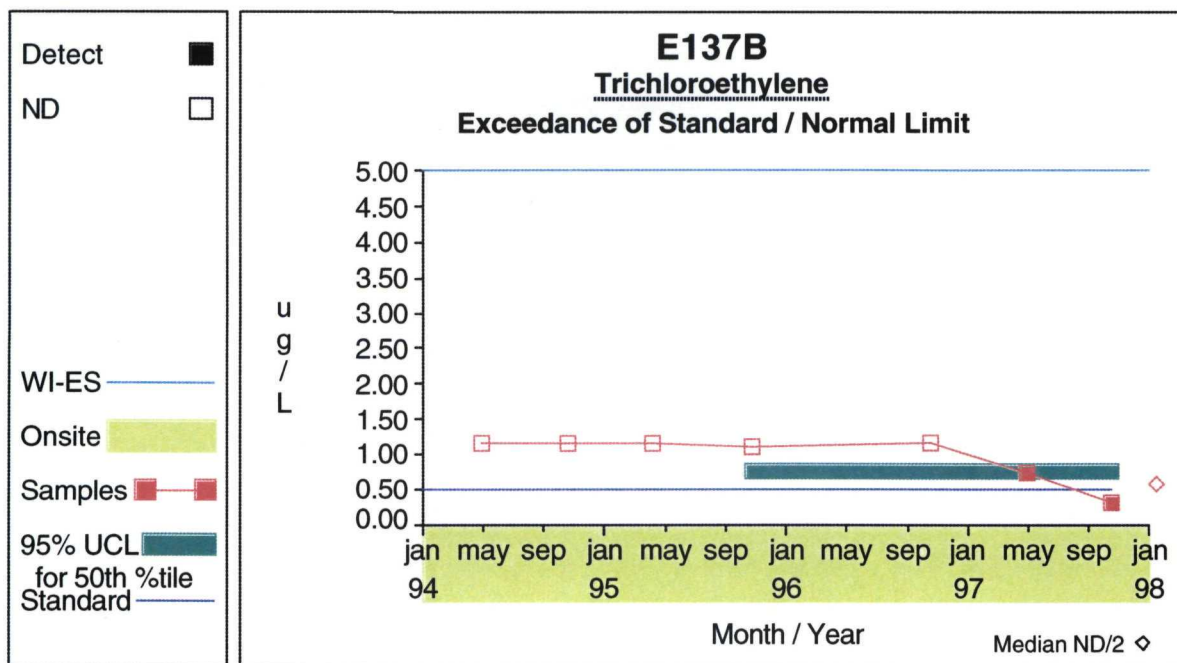


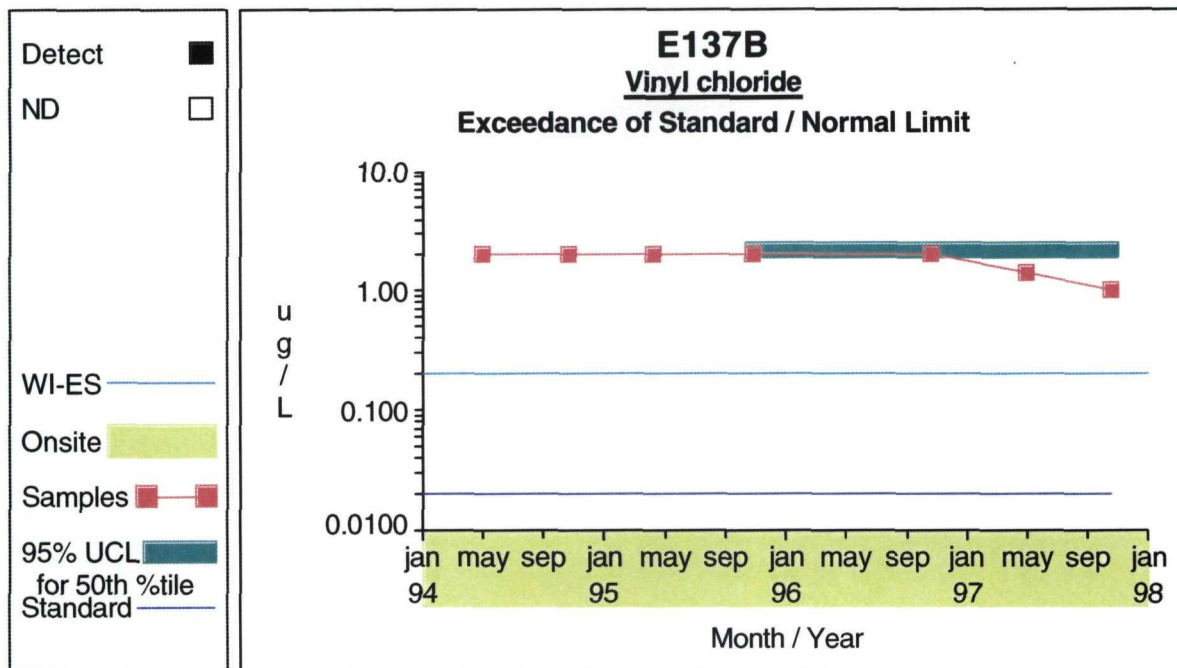
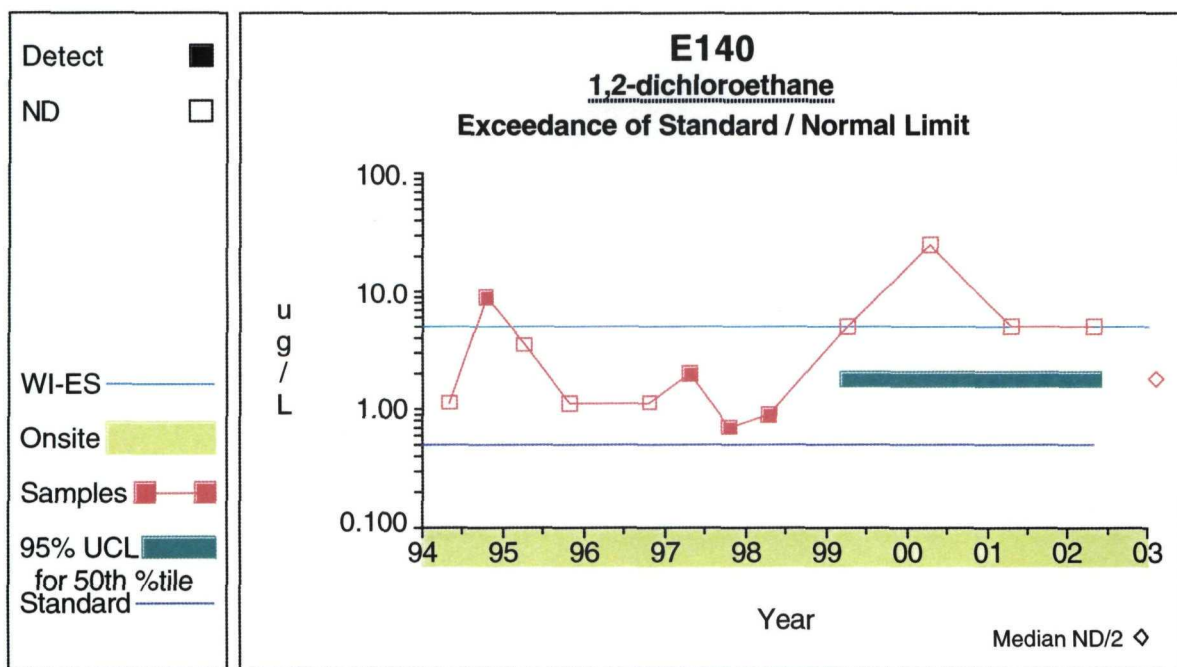
Graph 33

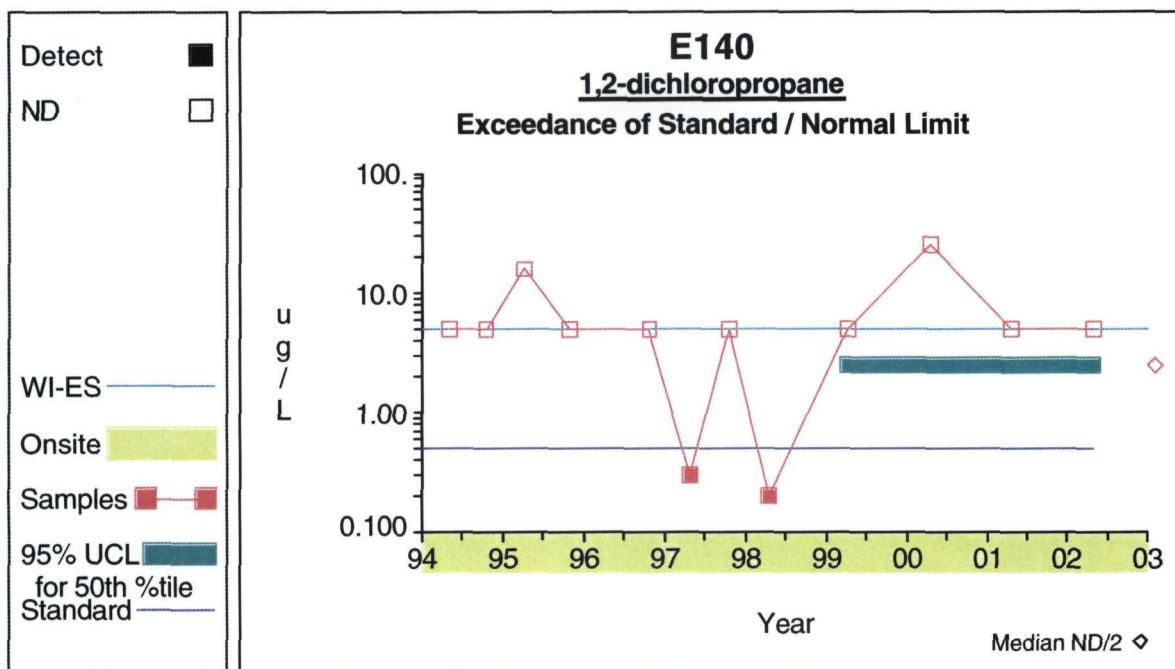
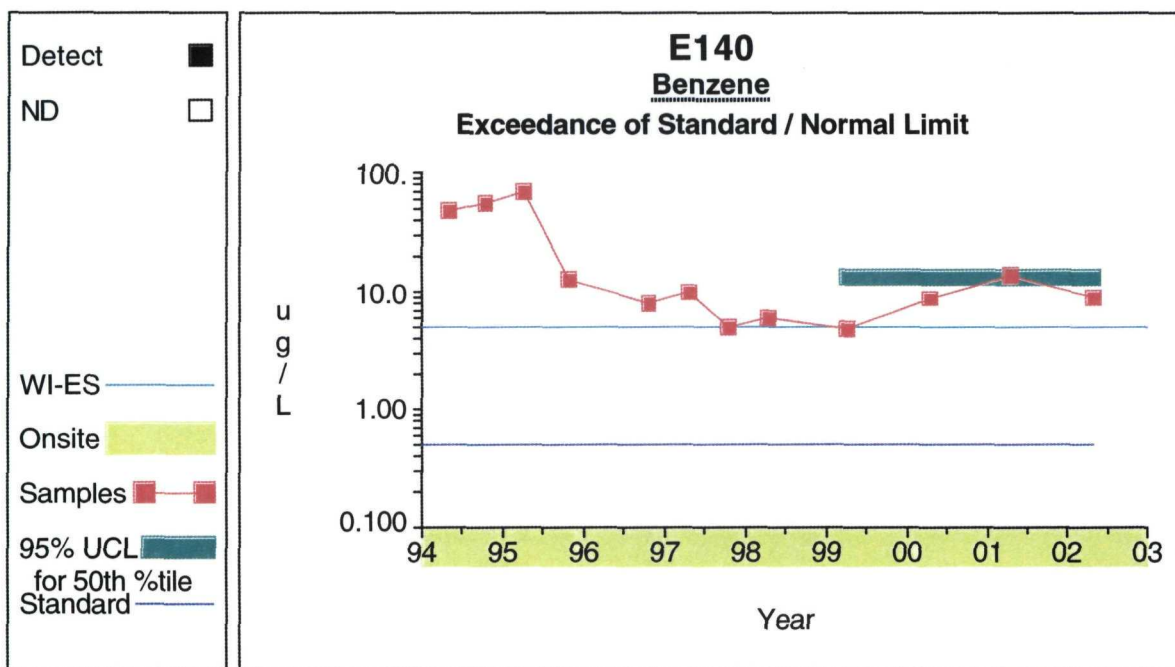
Comparison to Standard**Graph 38****Graph 39**

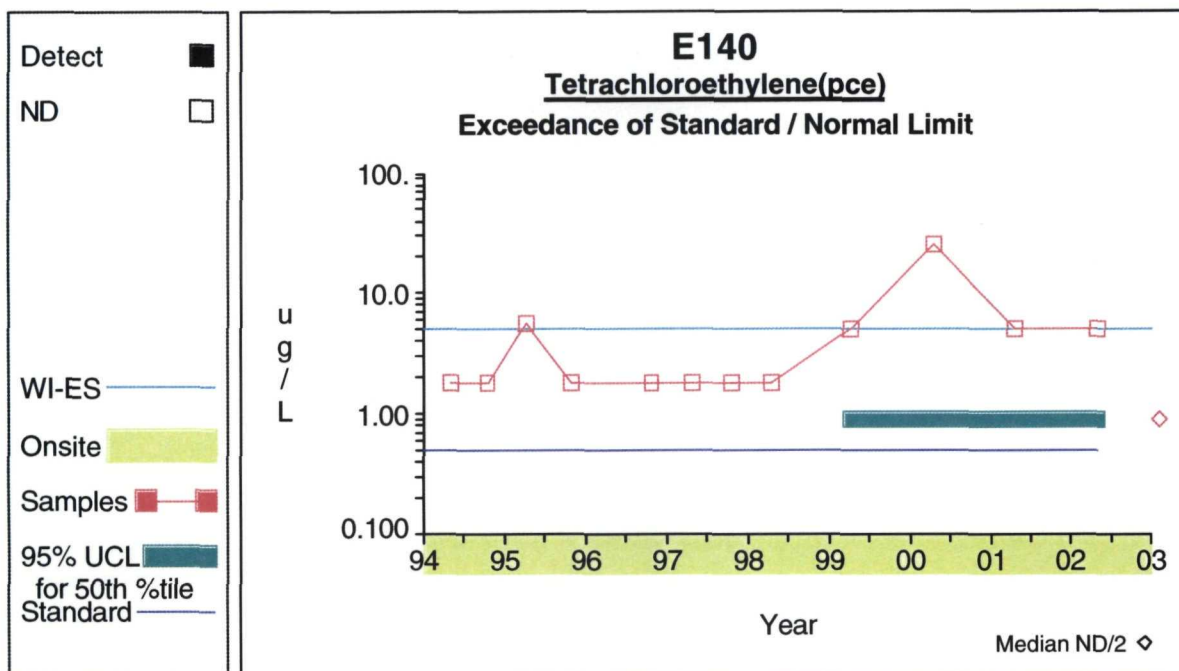
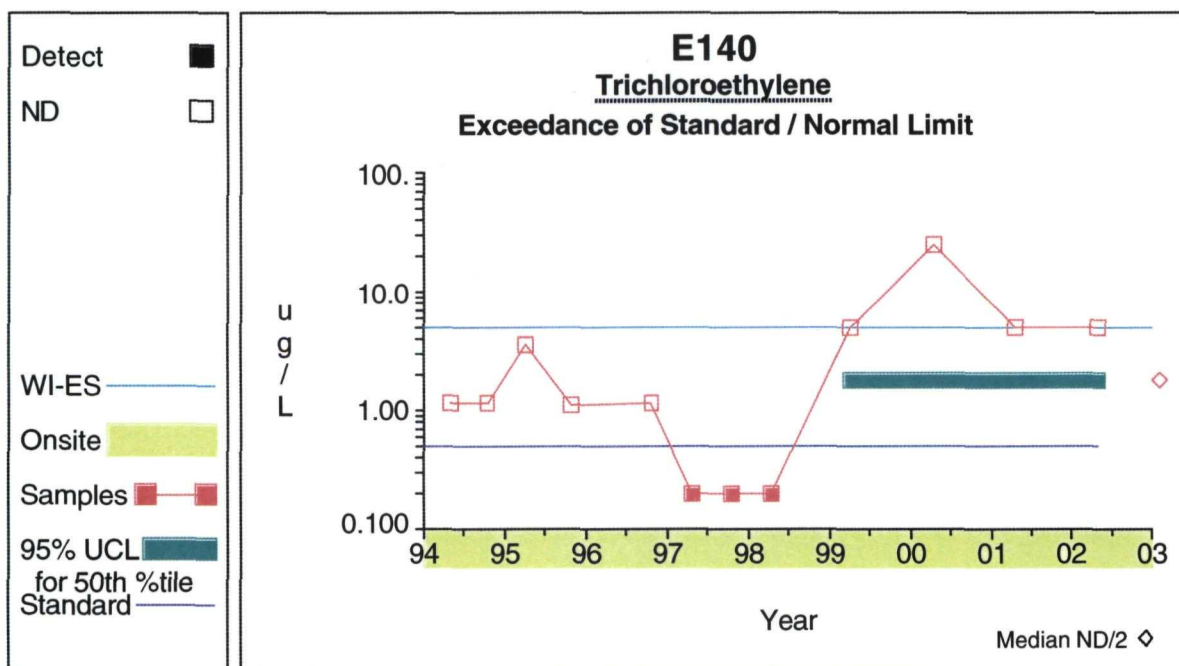
Comparison to Standard**Graph 40****Graph 41**

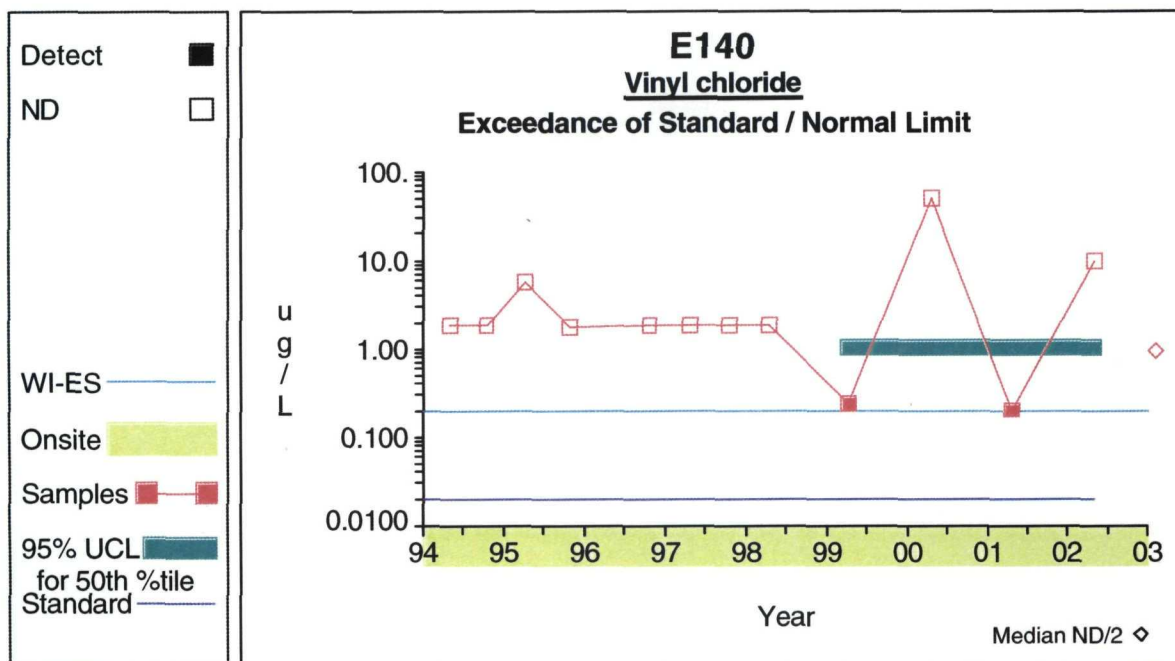
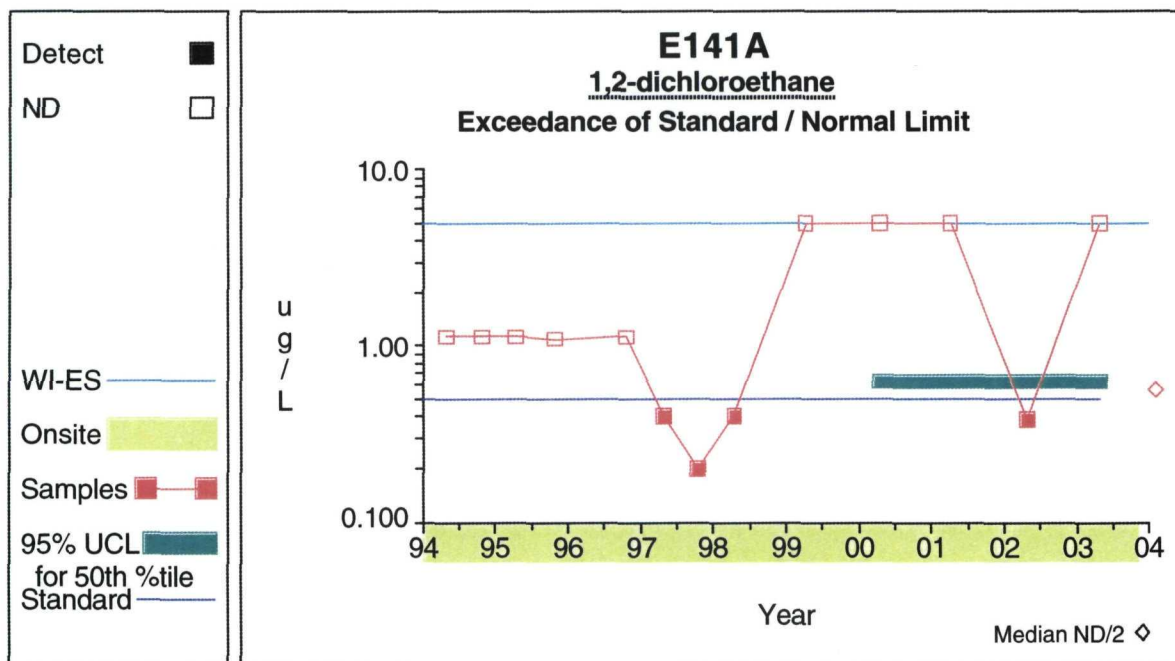
Comparison to Standard**Graph 42****Graph 43**

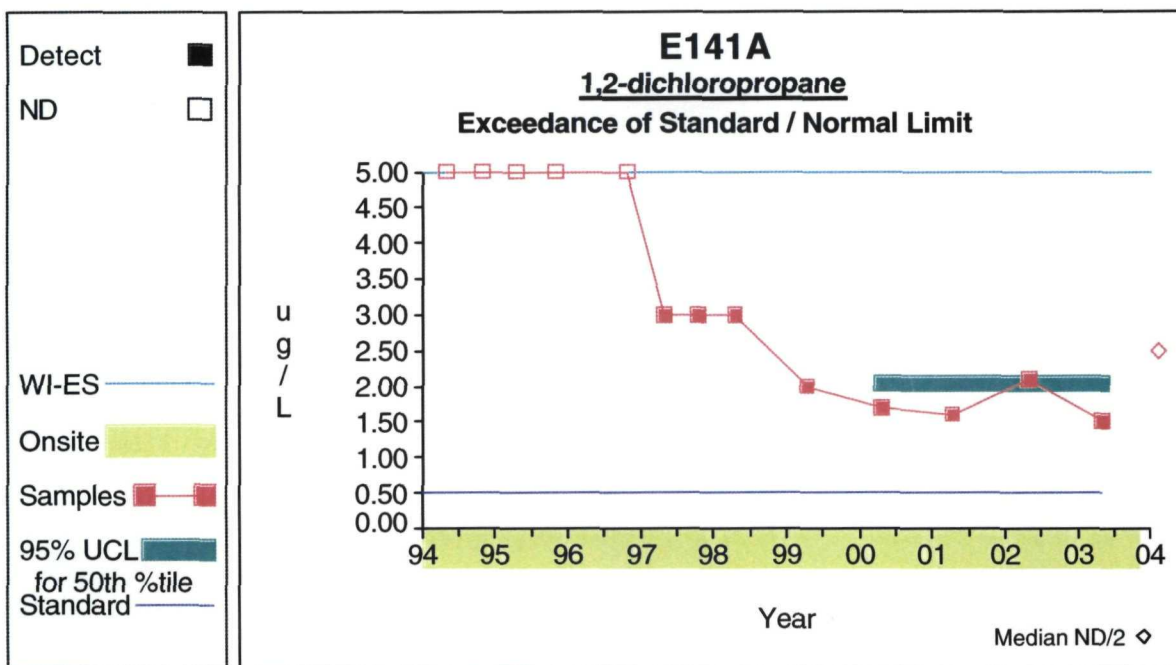
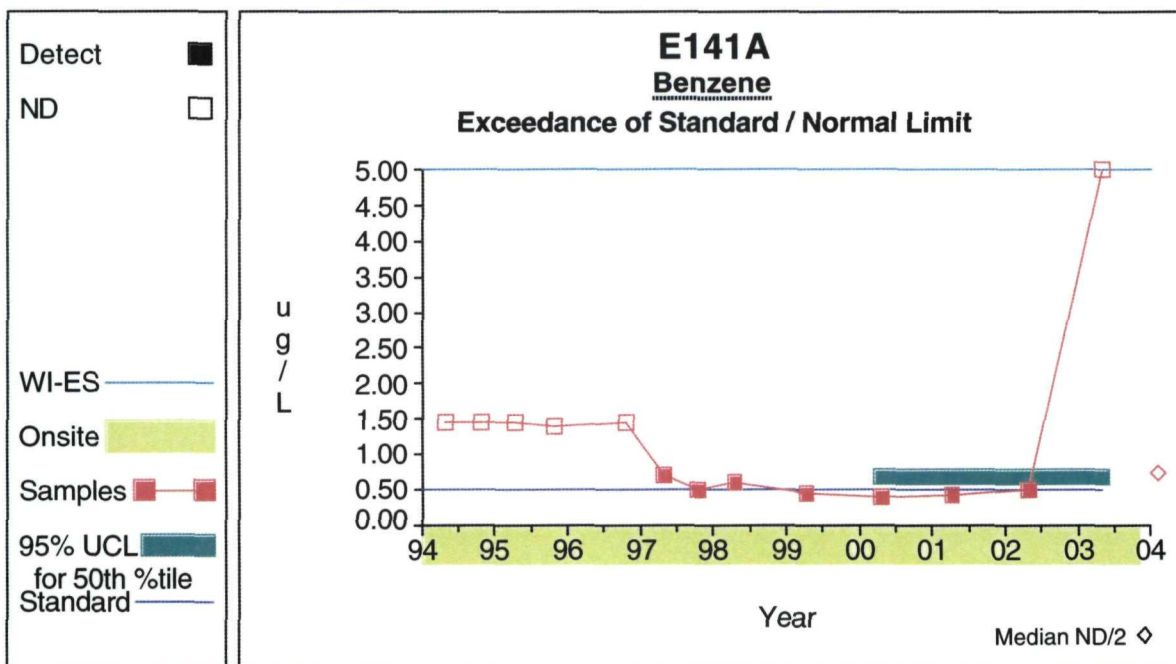
Comparison to Standard**Graph 48****Graph 49**

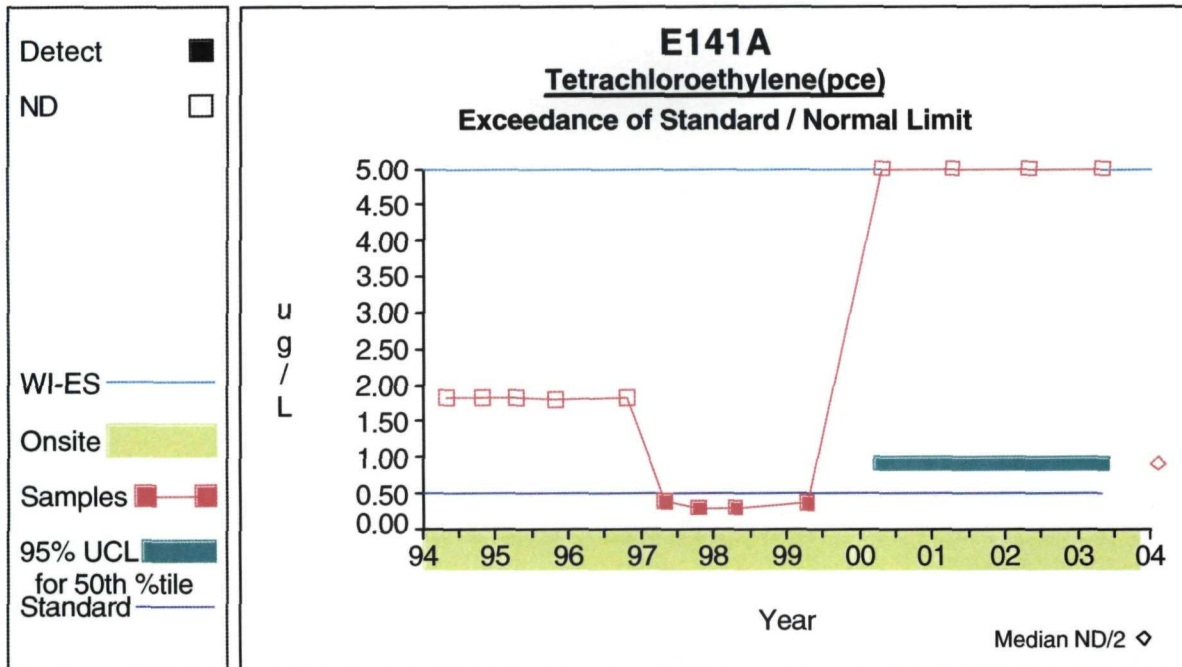
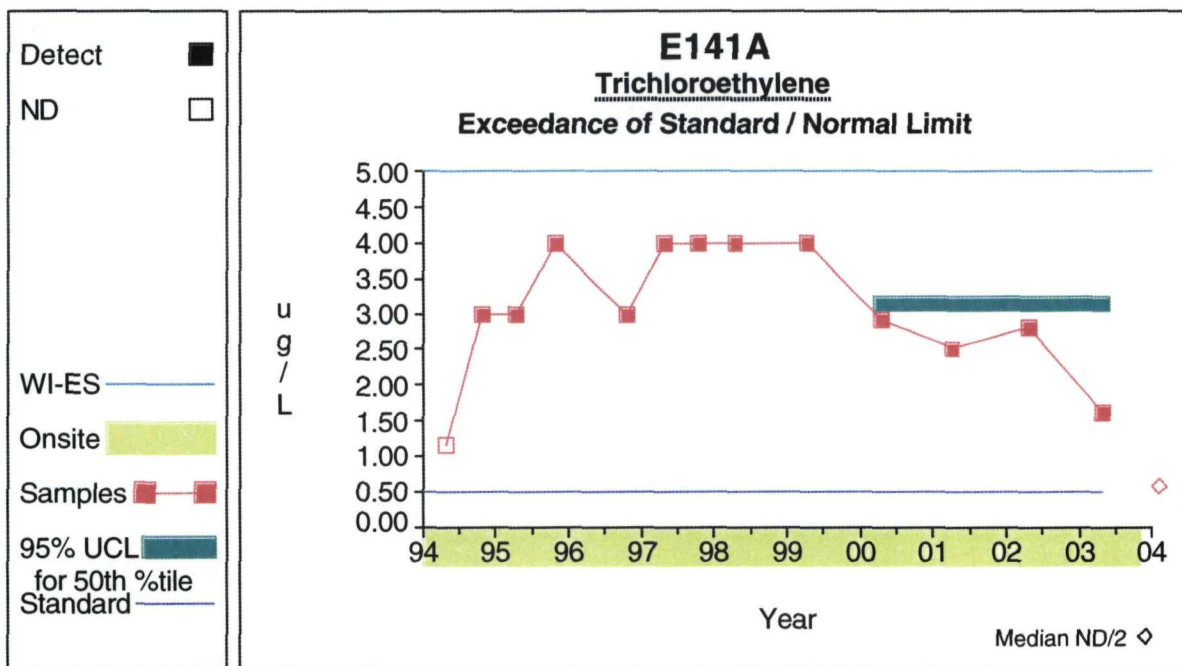
Comparison to Standard**Graph 50****Graph 51**

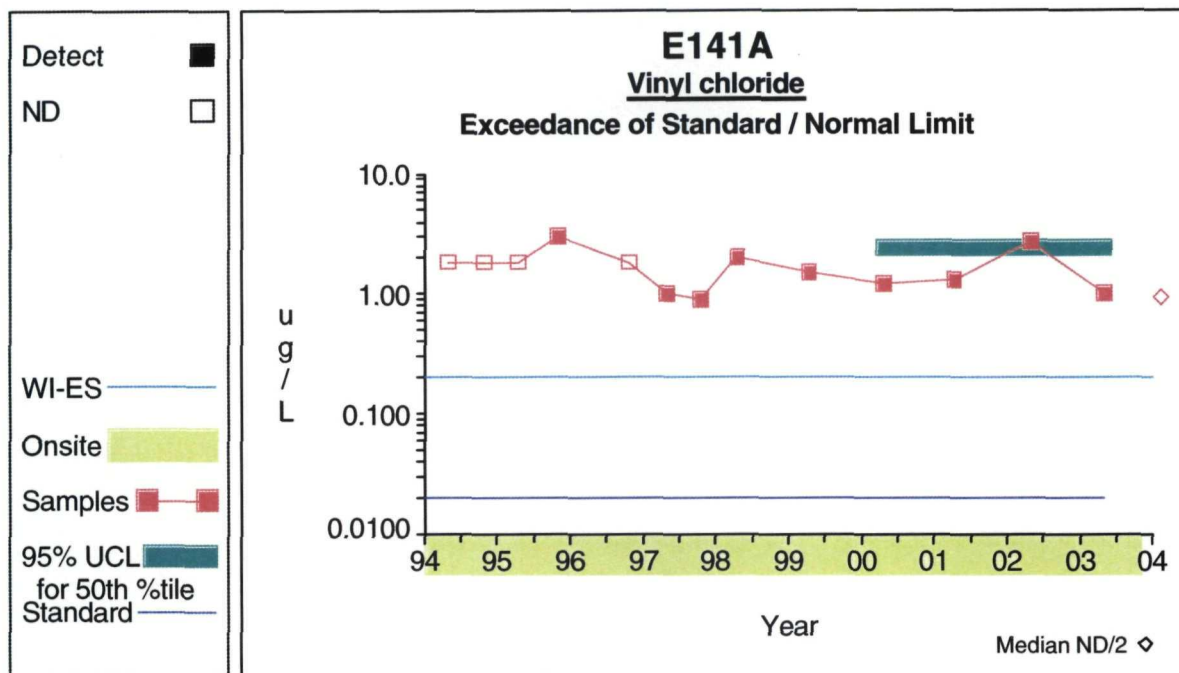
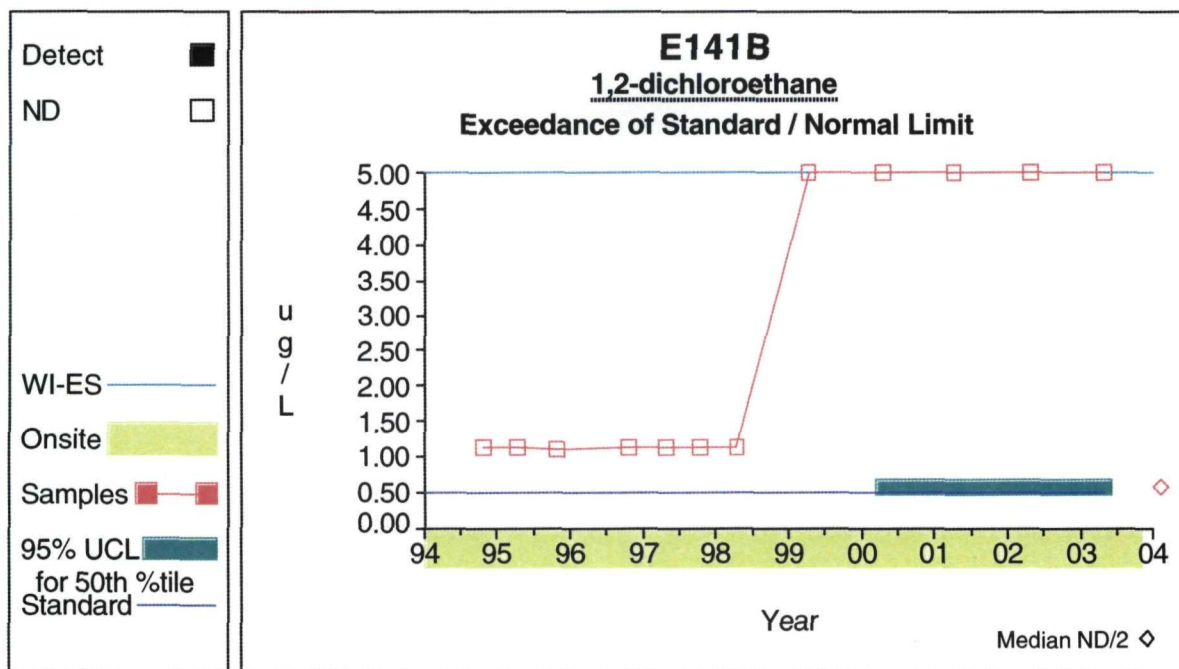
Comparison to Standard**Graph 52****Graph 53**

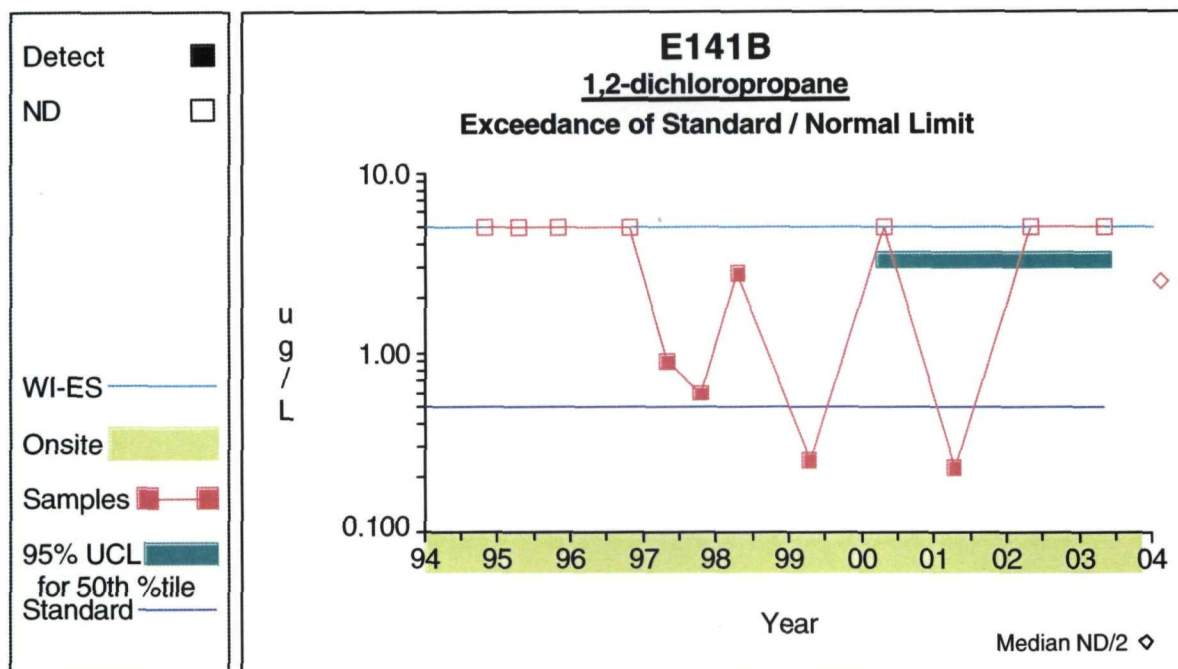
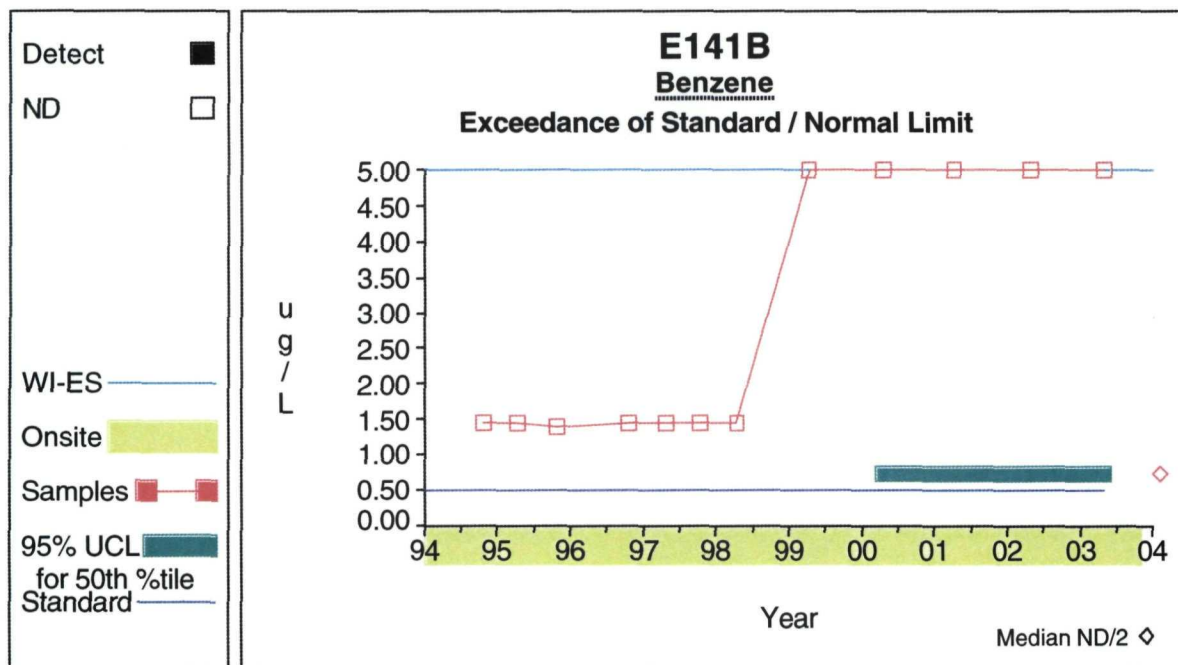
Comparison to Standard**Graph 58****Graph 59**

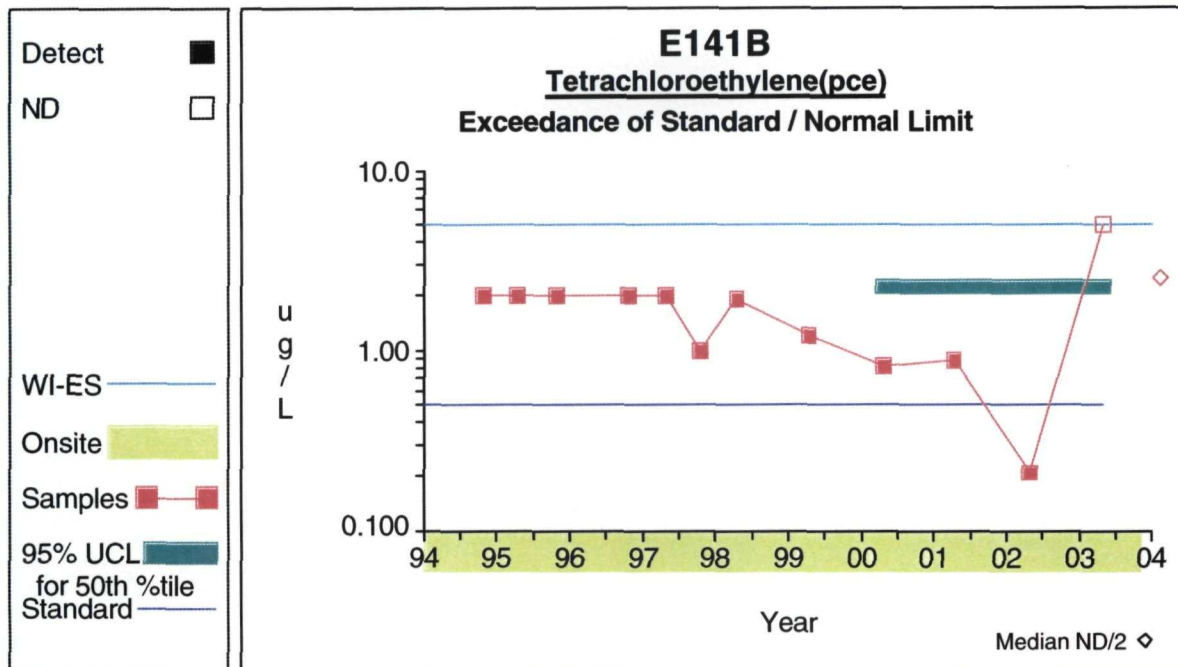
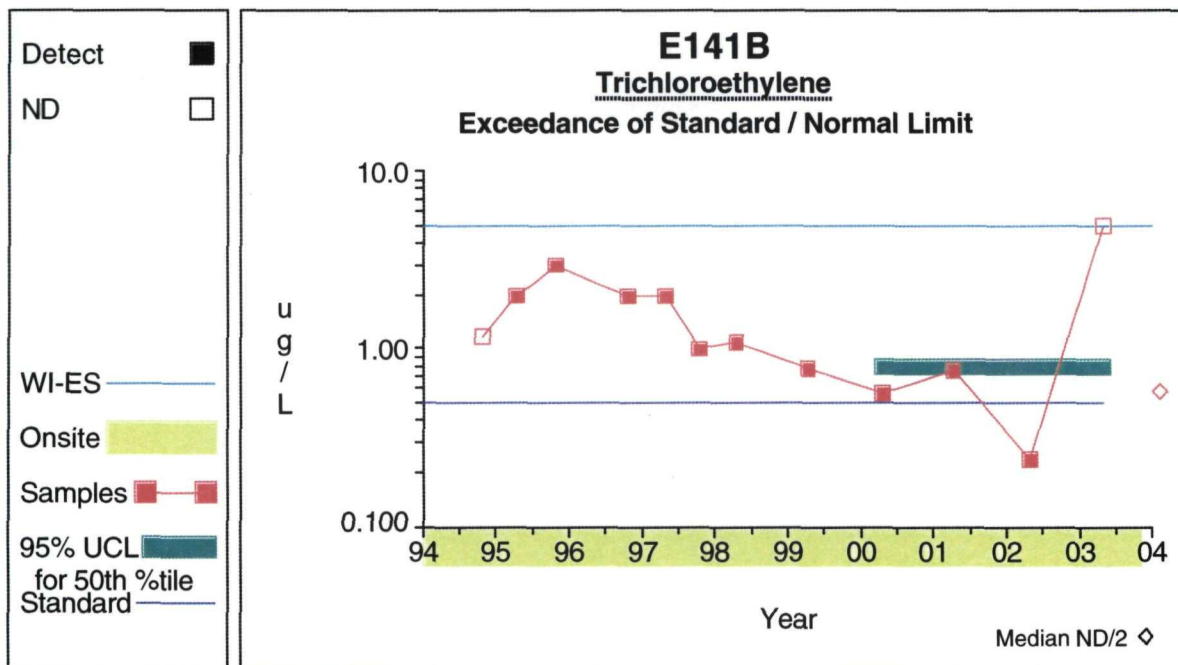
Comparison to Standard**Graph 60****Graph 61**

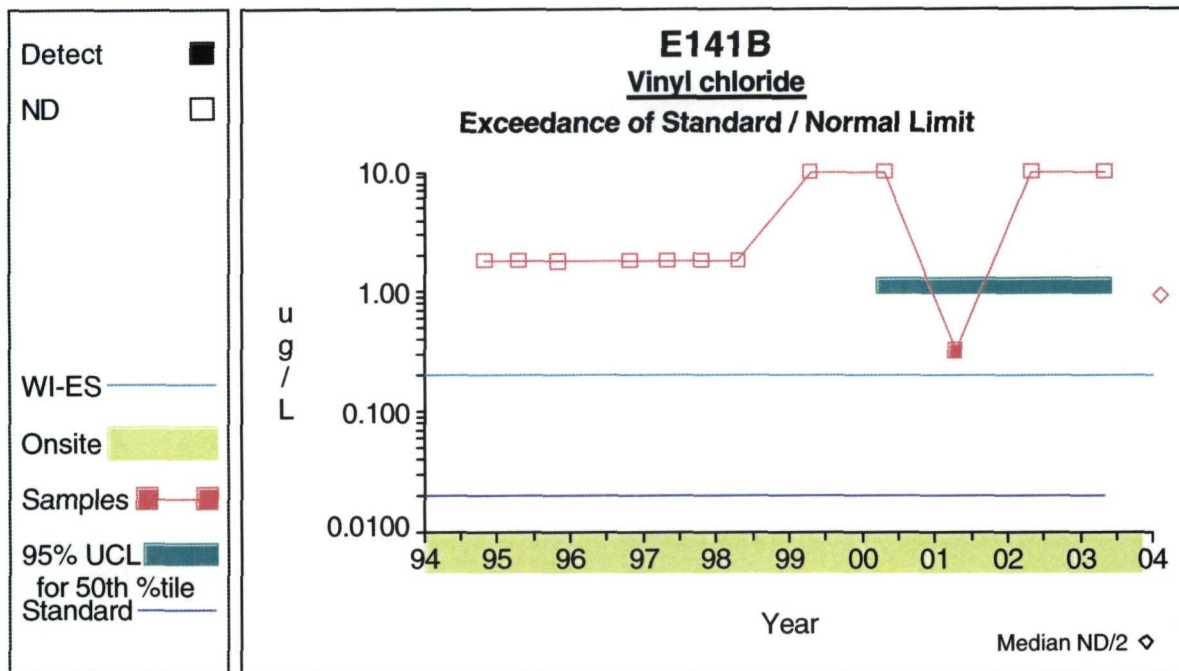
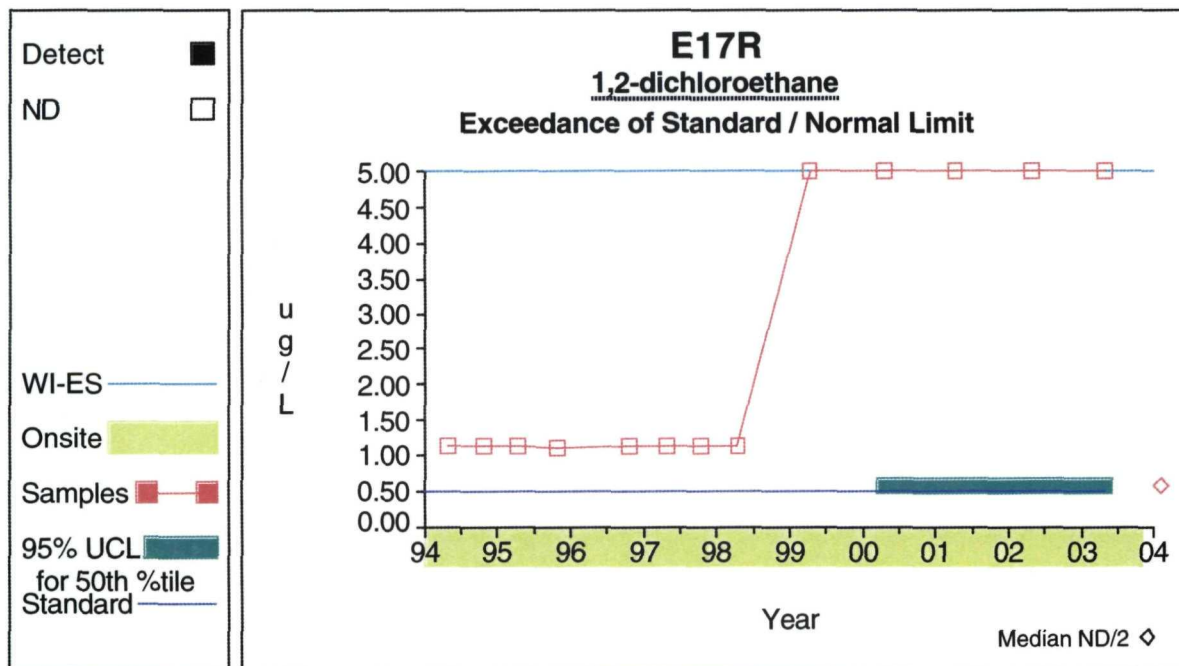
Comparison to Standard**Graph 62****Graph 63**

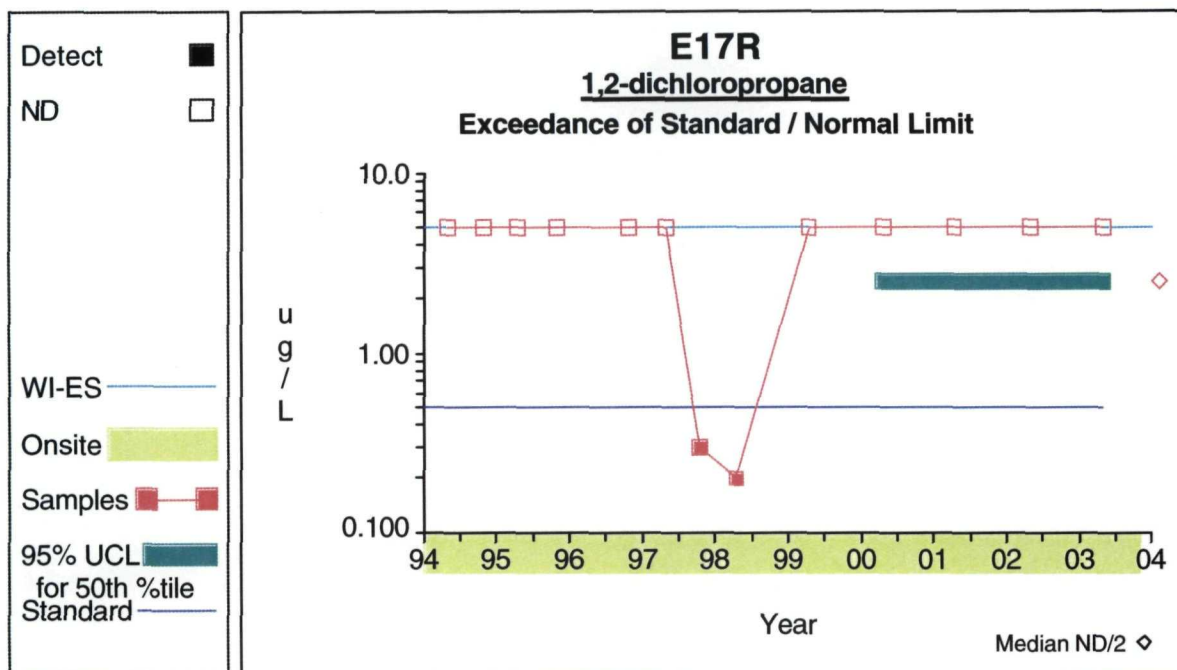
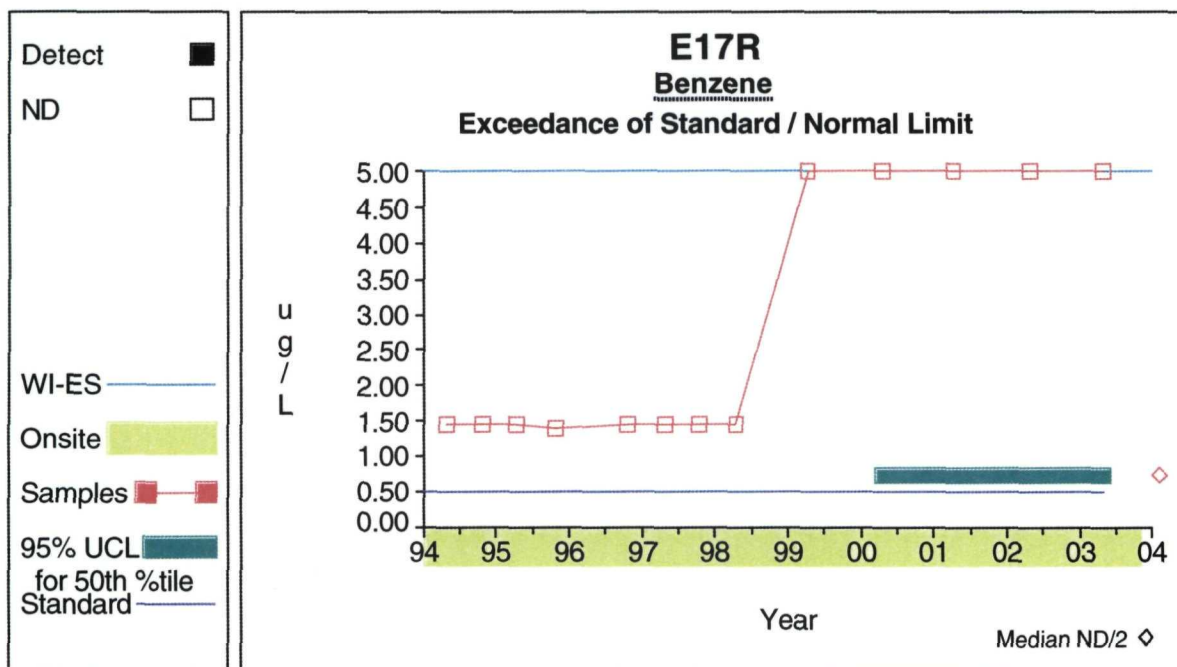
Comparison to Standard**Graph 68****Graph 69**

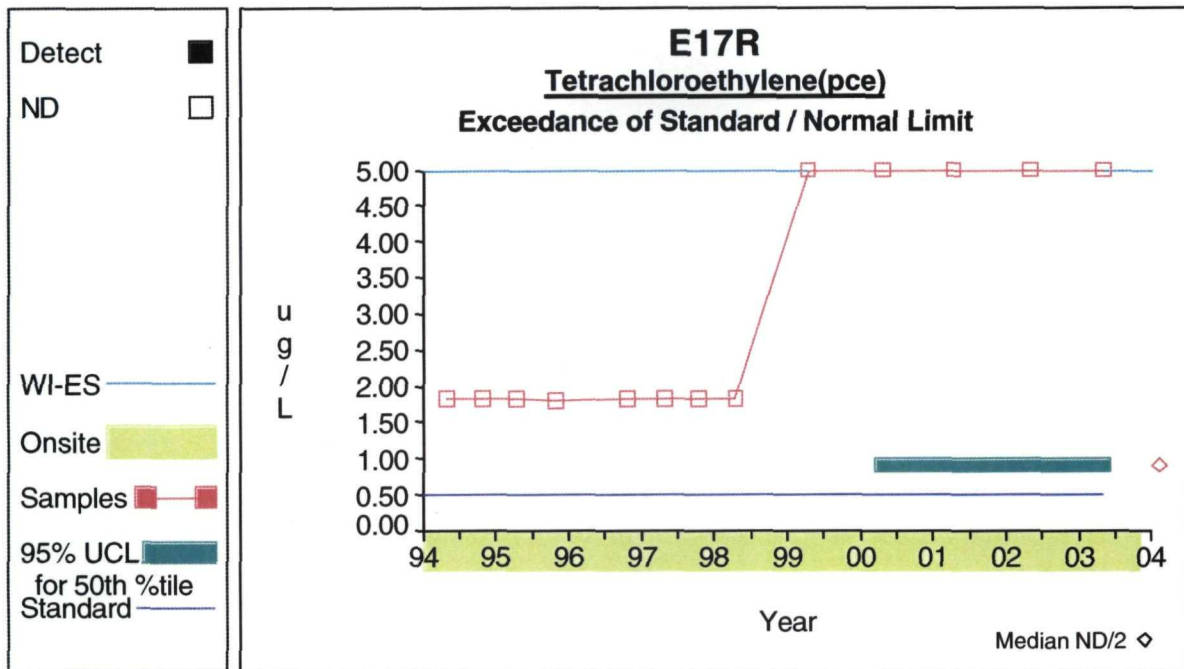
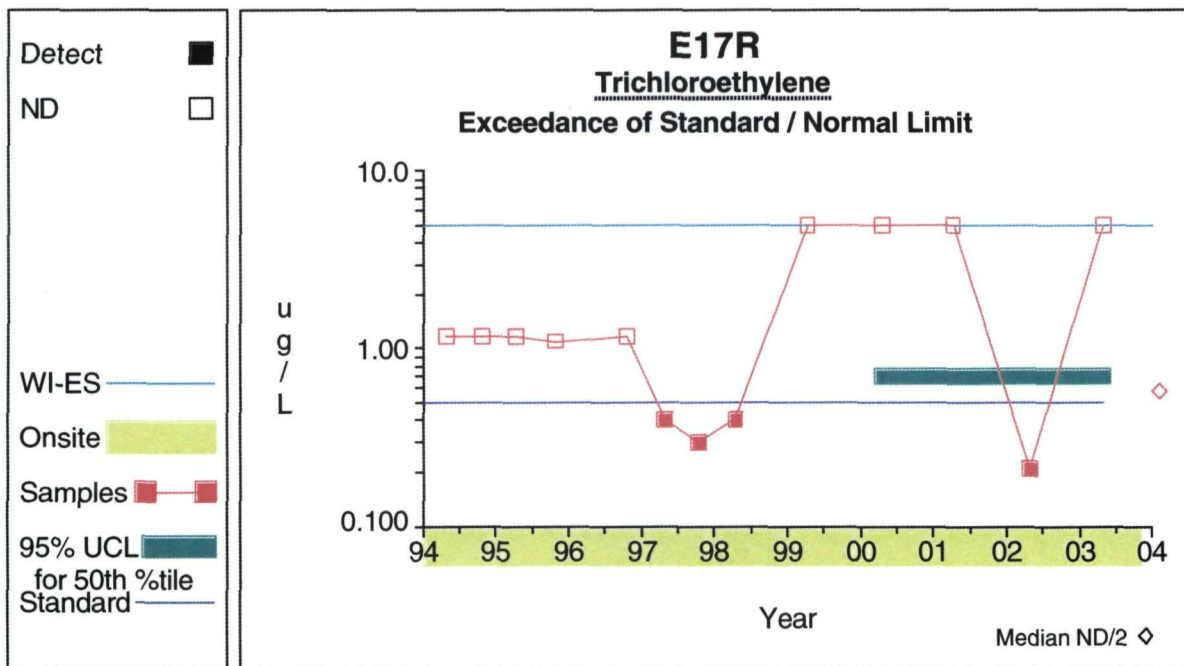
Comparison to Standard**Graph 70****Graph 71**

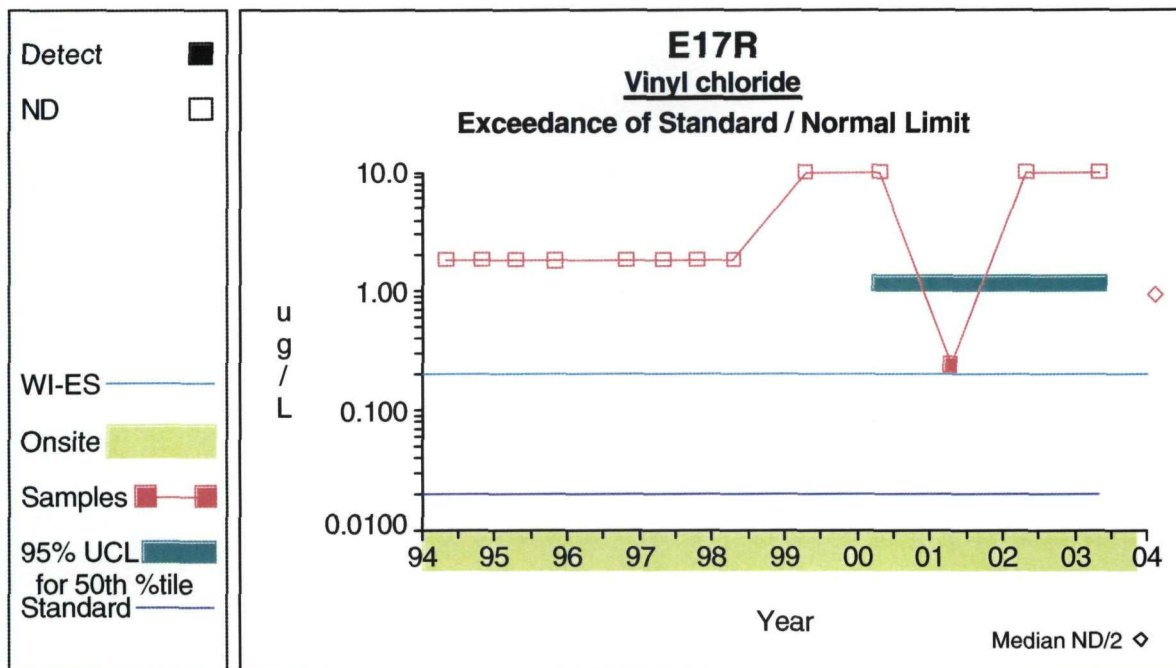
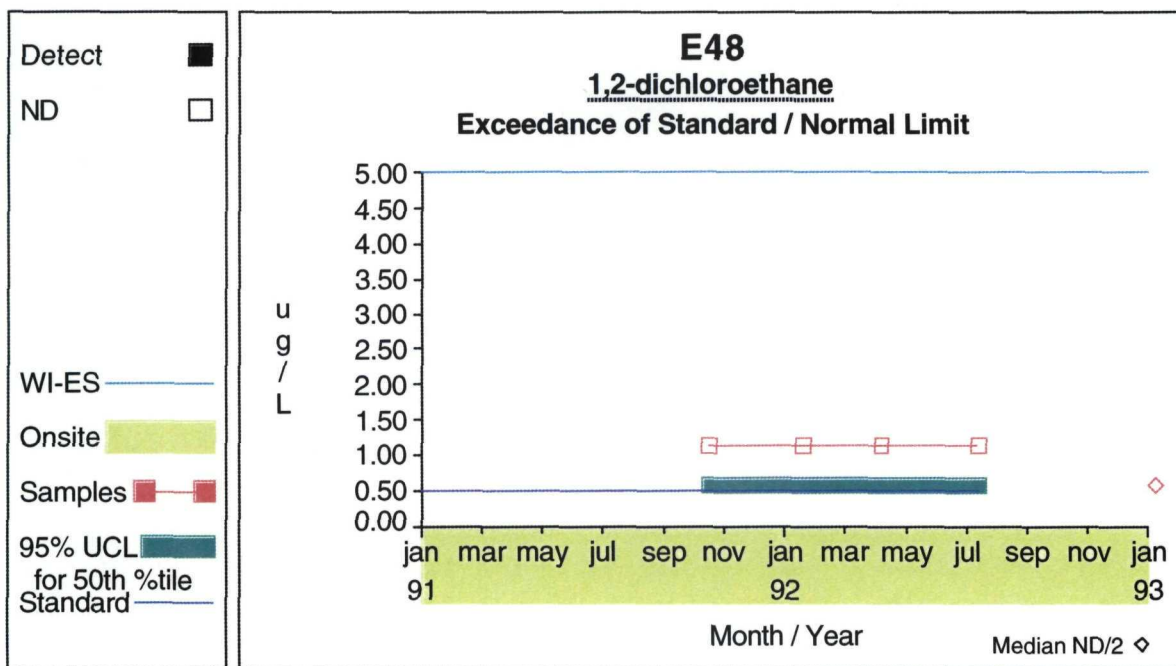
Comparison to Standard**Graph 72****Graph 73**

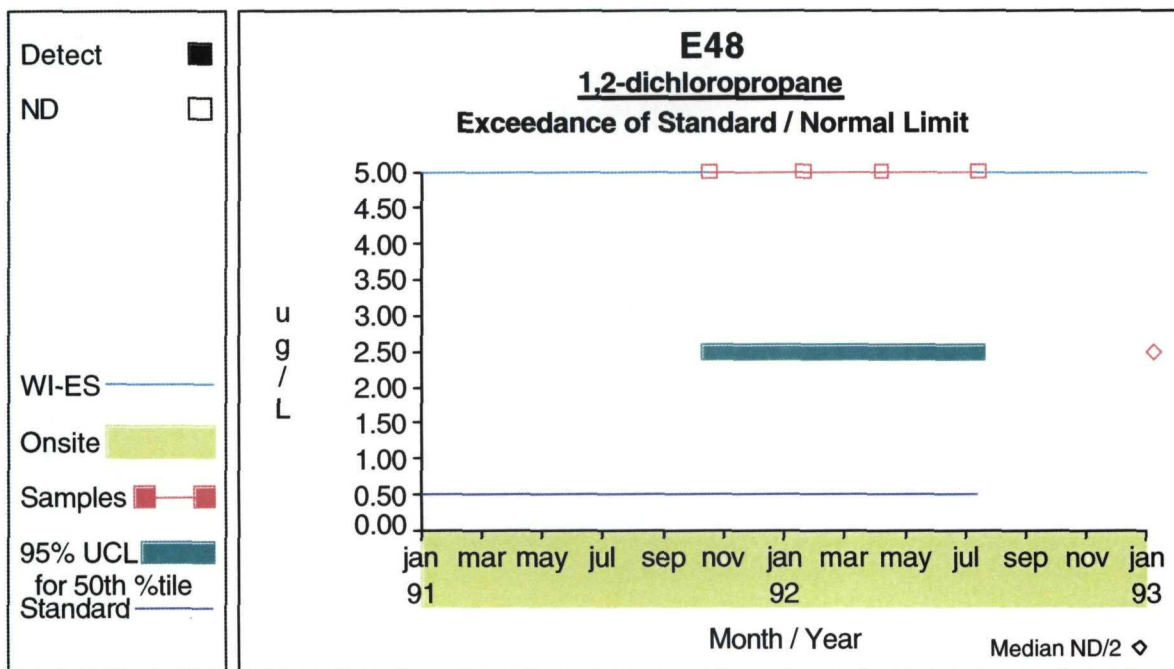
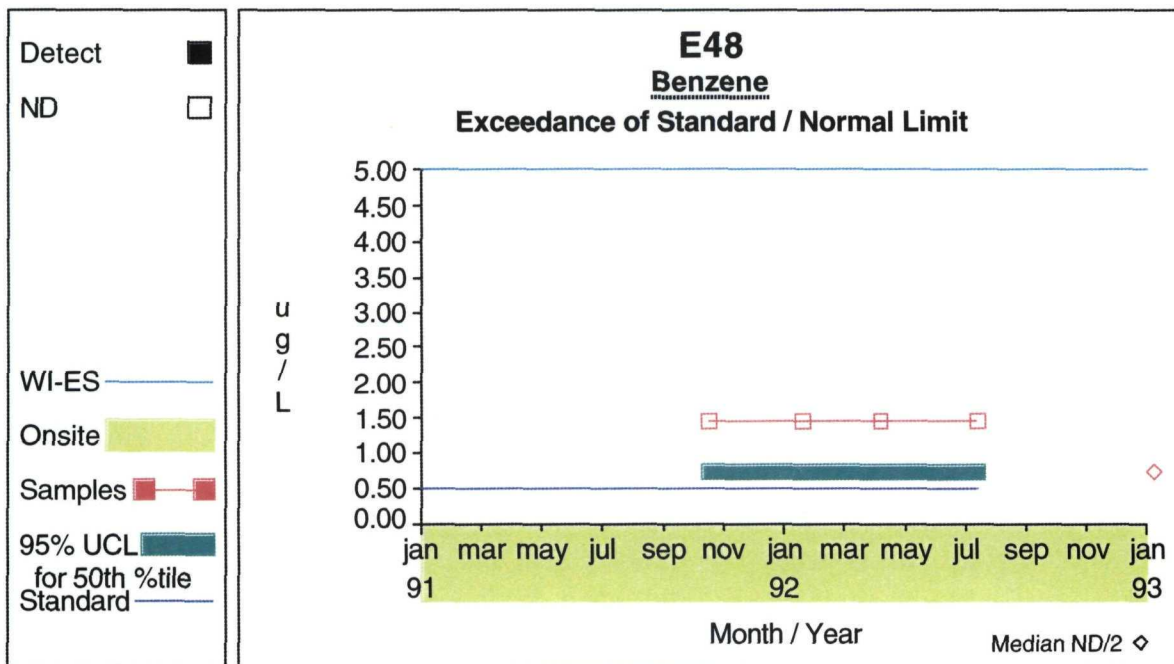
Comparison to Standard**Graph 78****Graph 79**

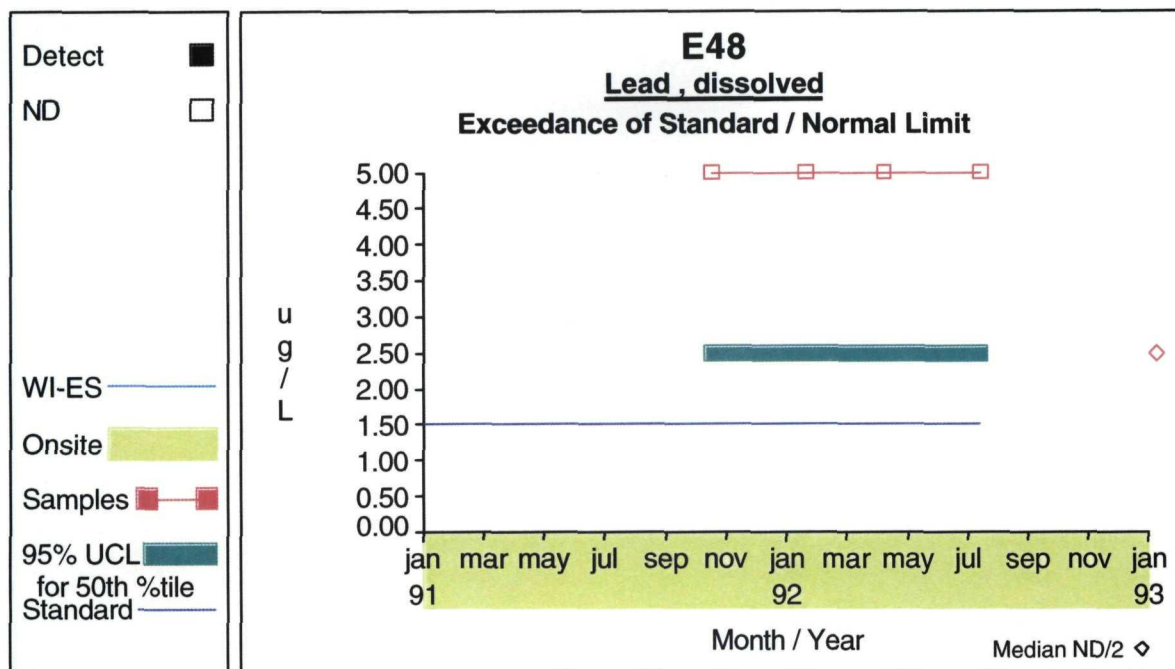
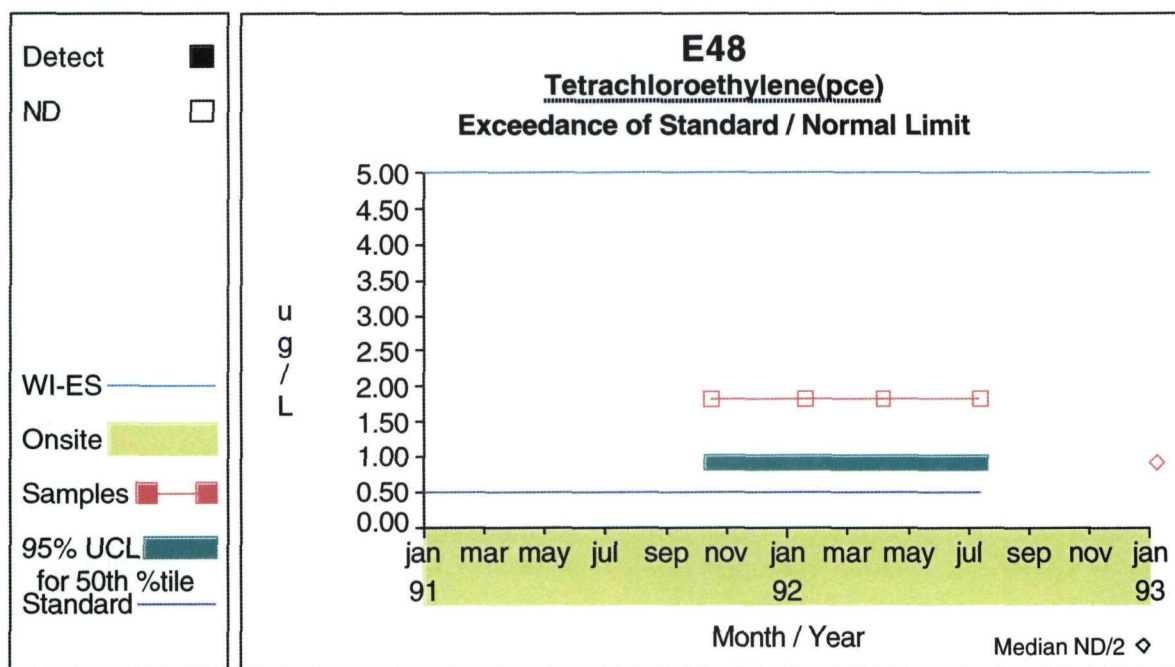
Comparison to Standard**Graph 80****Graph 81**

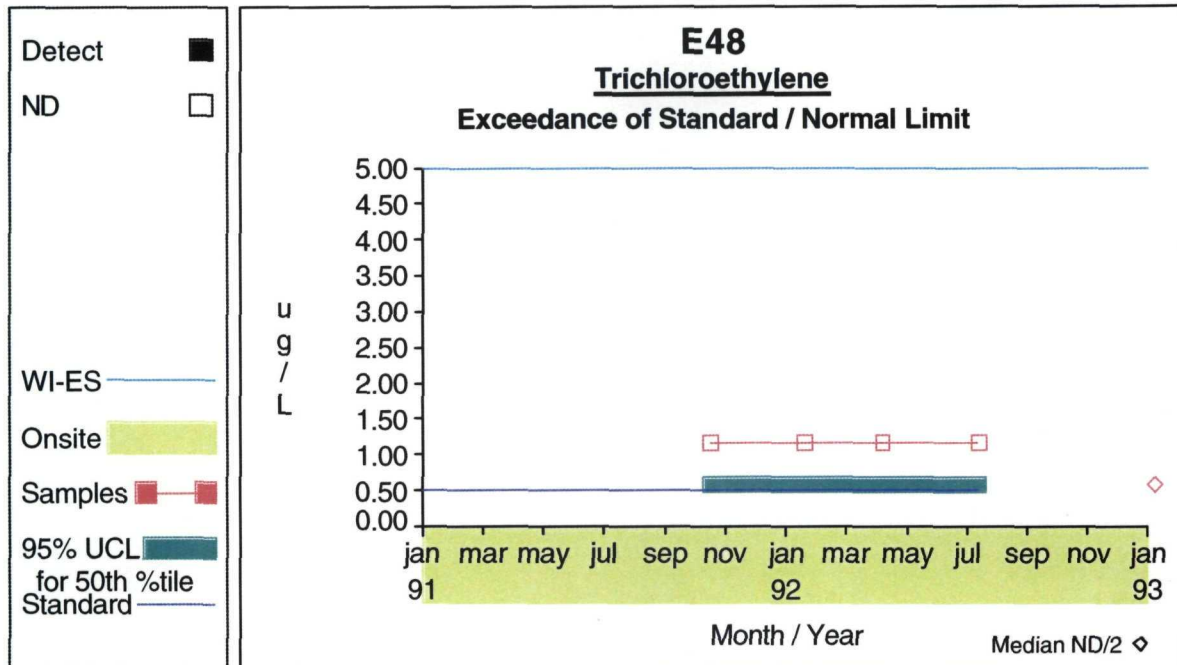
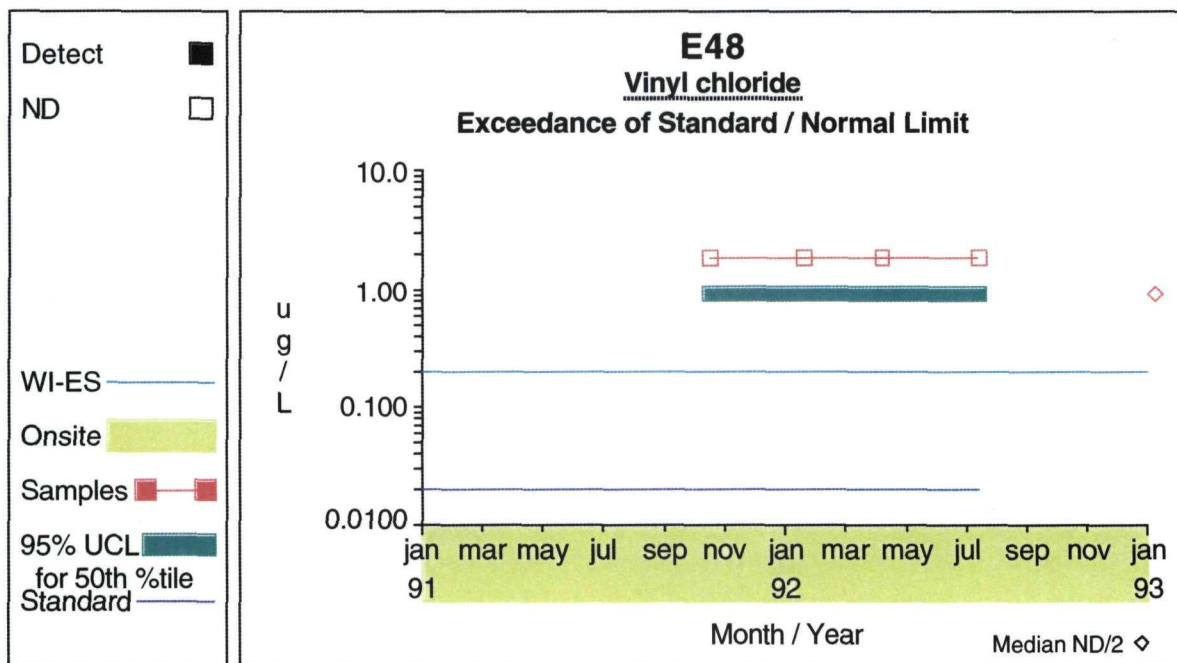
Comparison to Standard**Graph 82****Graph 83**

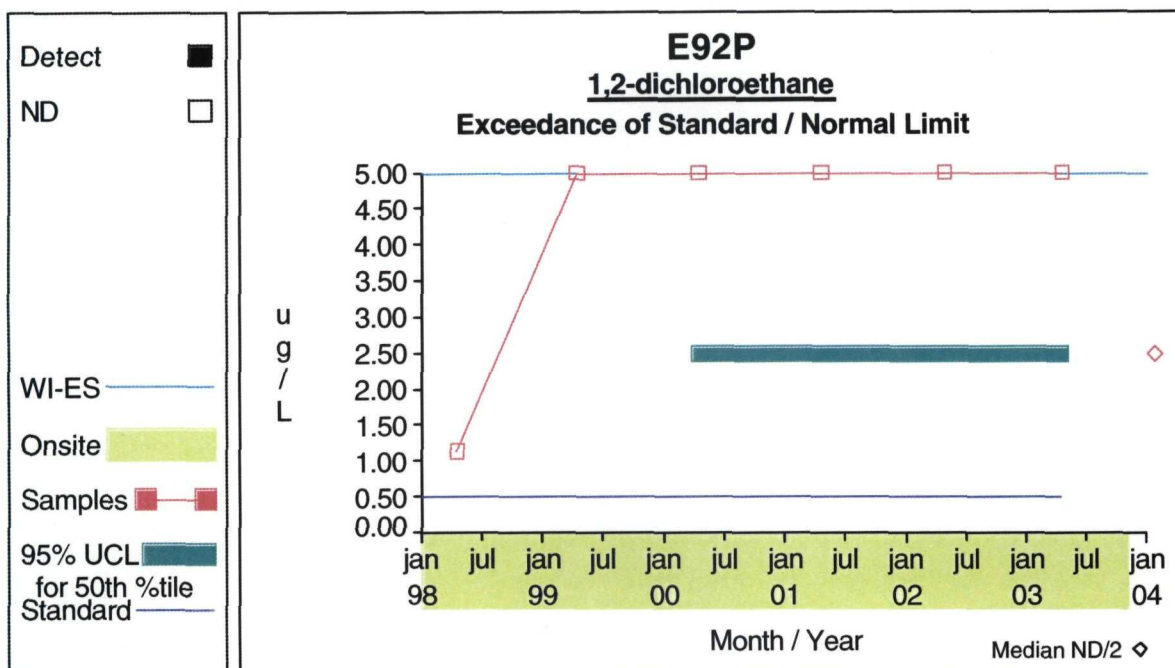
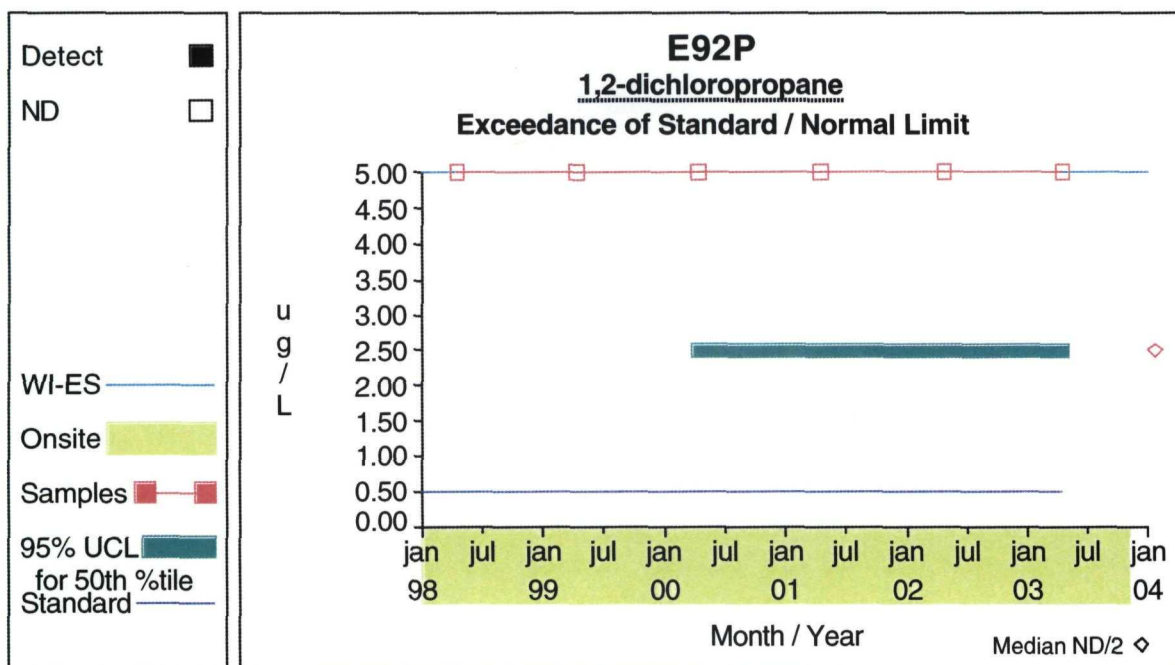
Comparison to Standard**Graph 88****Graph 89**

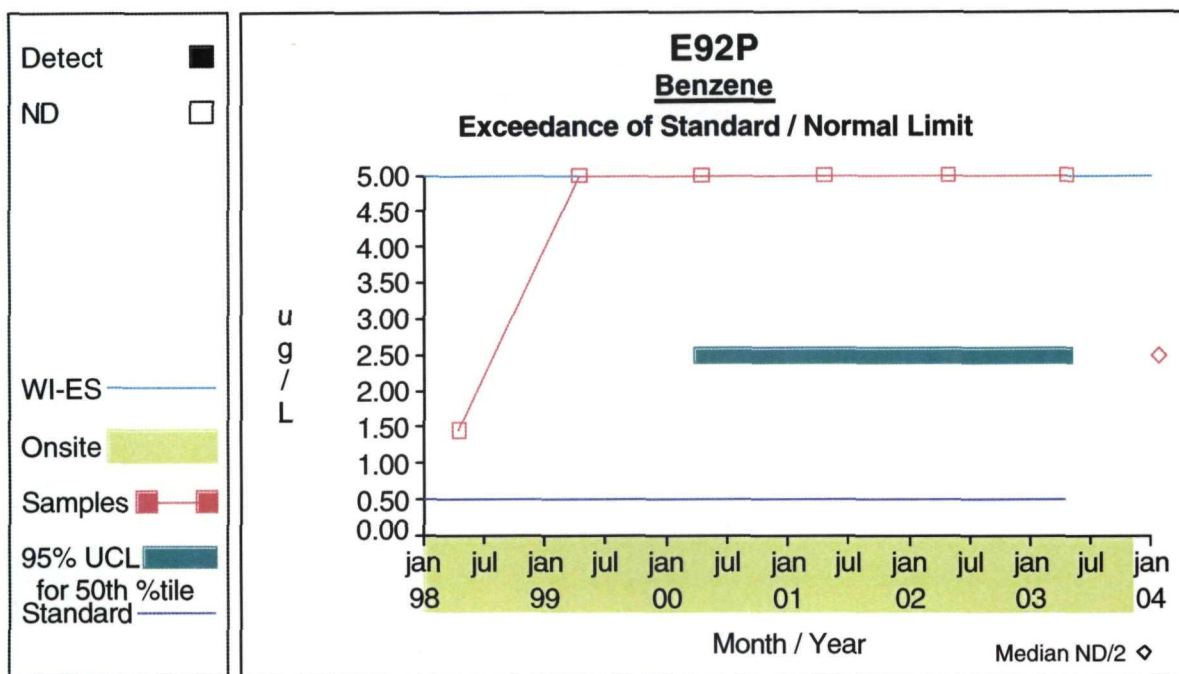
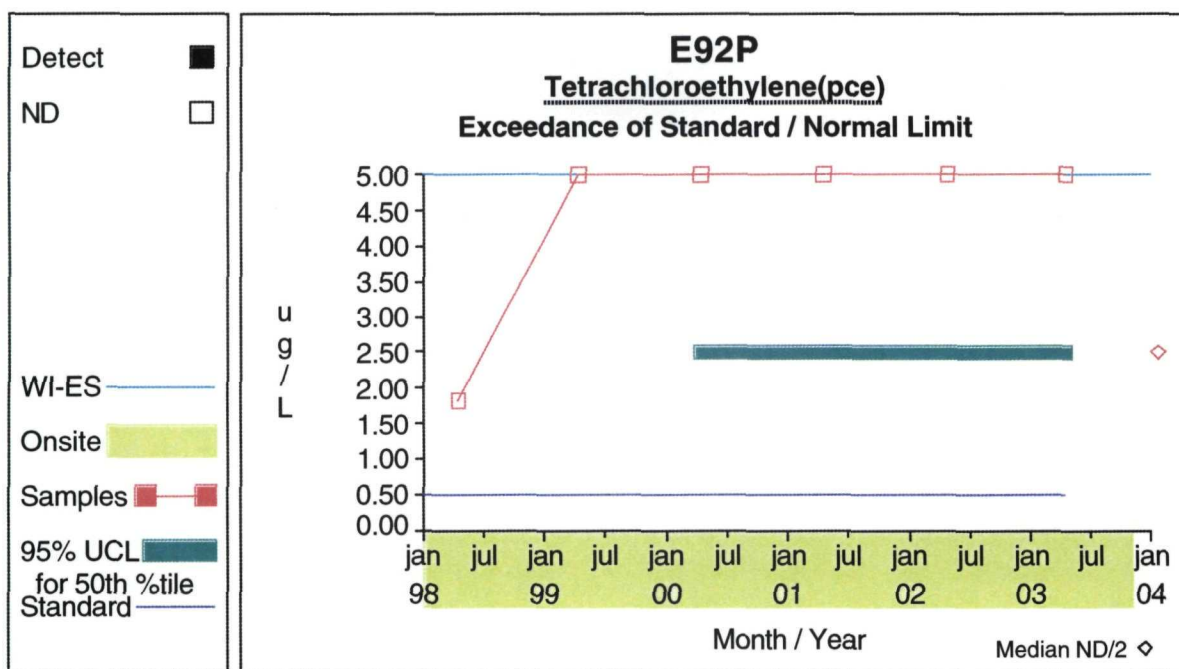
Comparison to Standard**Graph 90****Graph 91**

Comparison to Standard**Graph 92****Graph 93**

Comparison to Standard**Graph 97****Graph 98**

Comparison to Standard**Graph 99****Graph 100**

Comparison to Standard**Graph 101****Graph 102**

Comparison to Standard**Graph 103****Graph 108**

E92P
Trichloroethylene
Exceedance of Standard / Normal Limit

Y-axis: ug / L

X-axis: Month / Year

Legend:

- Detect (Black square)
- ND (White square)
- WI-ES (Blue line)
- Onsite (Yellow rectangle)
- Samples (Red square)
- 95% UCL for 50th %tile (Green rectangle)
- Standard (Blue line)

Median ND/2 ◇

Month / Year	Onsite (ug/L)	Standard (ug/L)	95% UCL for 50th %tile (ug/L)	WI-ES (ug/L)
Jan 98	1.2	0.5	2.5 - 2.75	5.0
Jul 99	5.0	0.5	2.5 - 2.75	5.0
Jan 00	5.0	0.5	2.5 - 2.75	5.0
Jul 00	5.0	0.5	2.5 - 2.75	5.0
Jan 01	5.0	0.5	2.5 - 2.75	5.0
Jul 01	5.0	0.5	2.5 - 2.75	5.0
Jan 02	5.0	0.5	2.5 - 2.75	5.0
Jul 02	5.0	0.5	2.5 - 2.75	5.0
Jan 03	5.0	0.5	2.5 - 2.75	5.0
Jul 03	5.0	0.5	2.5 - 2.75	5.0
Jan 04	2.5	0.5	2.5 - 2.75	5.0

E92P
Vinyl chloride
Exceedance of Standard / Normal Limit

Y-axis: $\mu\text{g} / \text{L}$

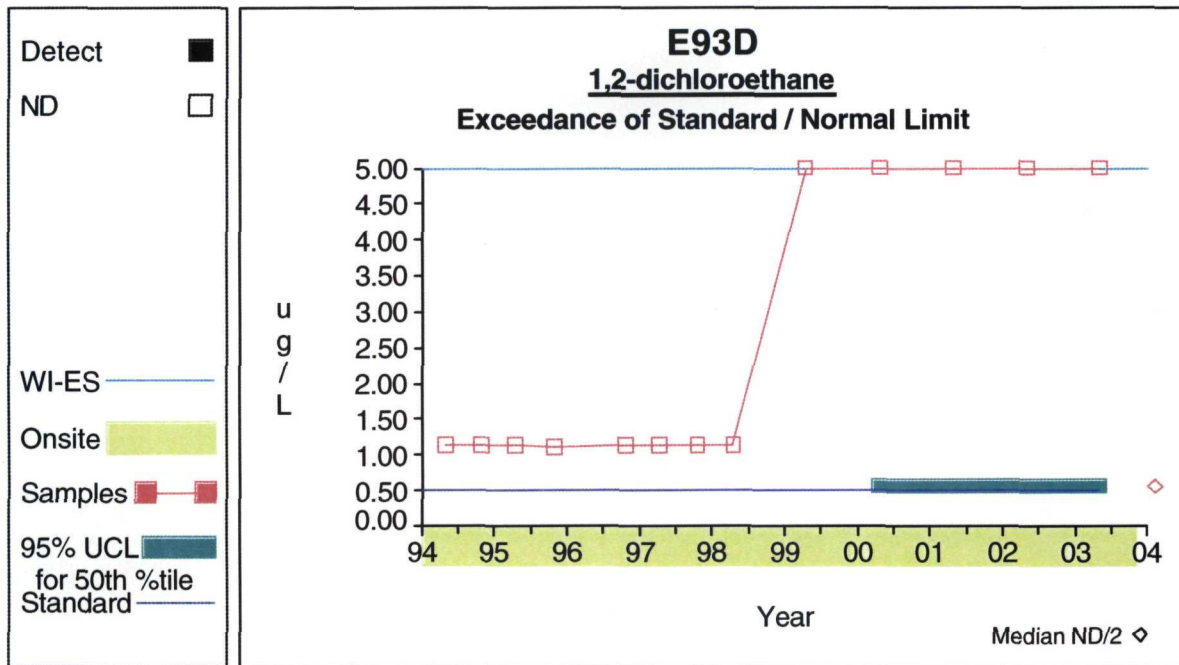
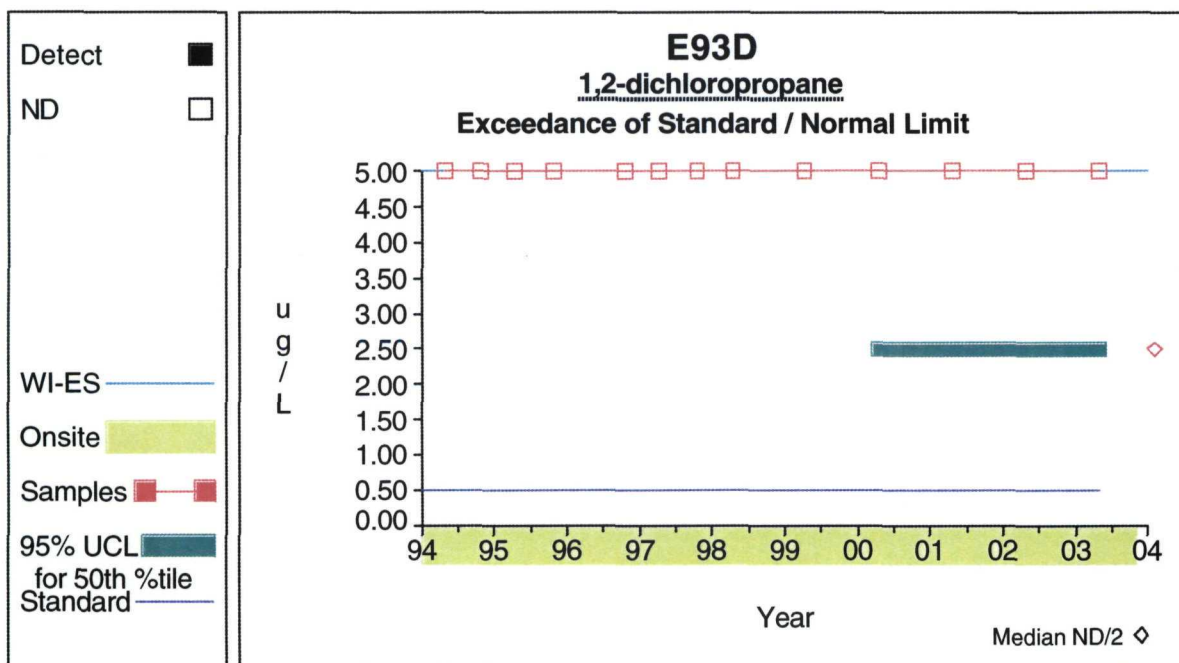
X-axis: Month / Year

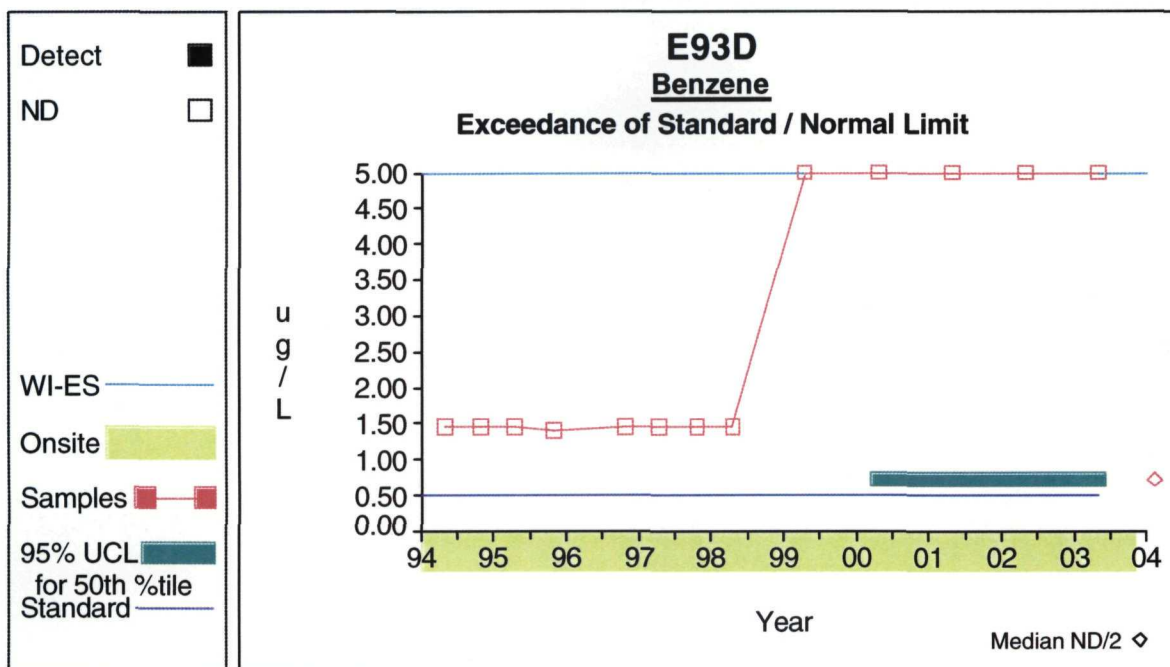
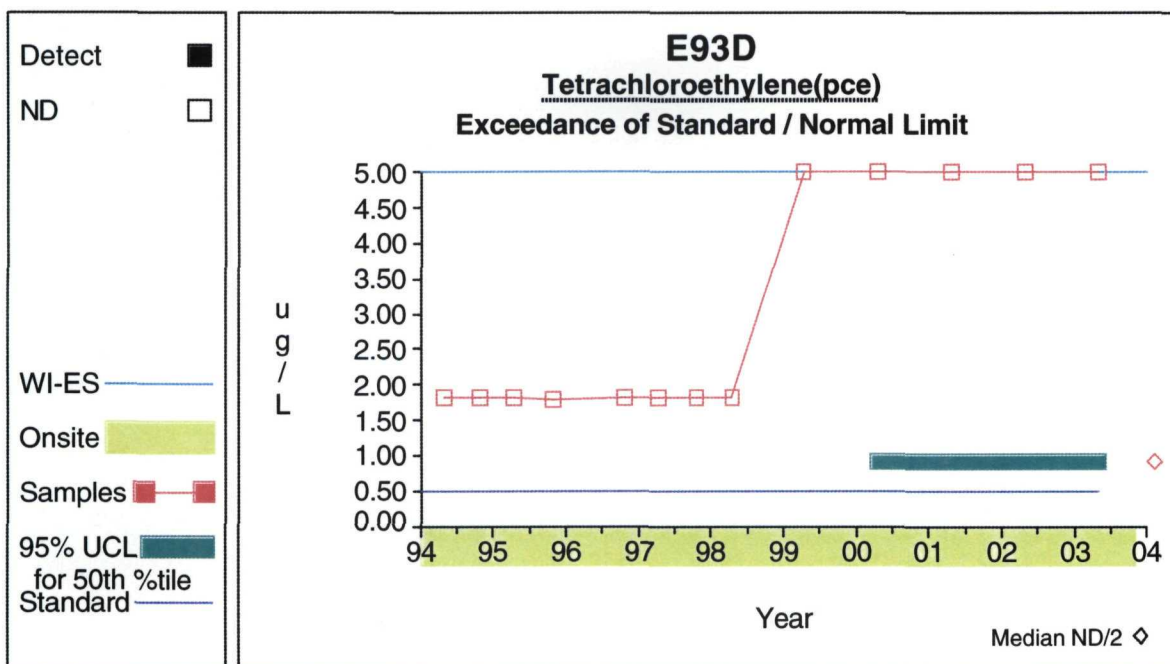
Legend:

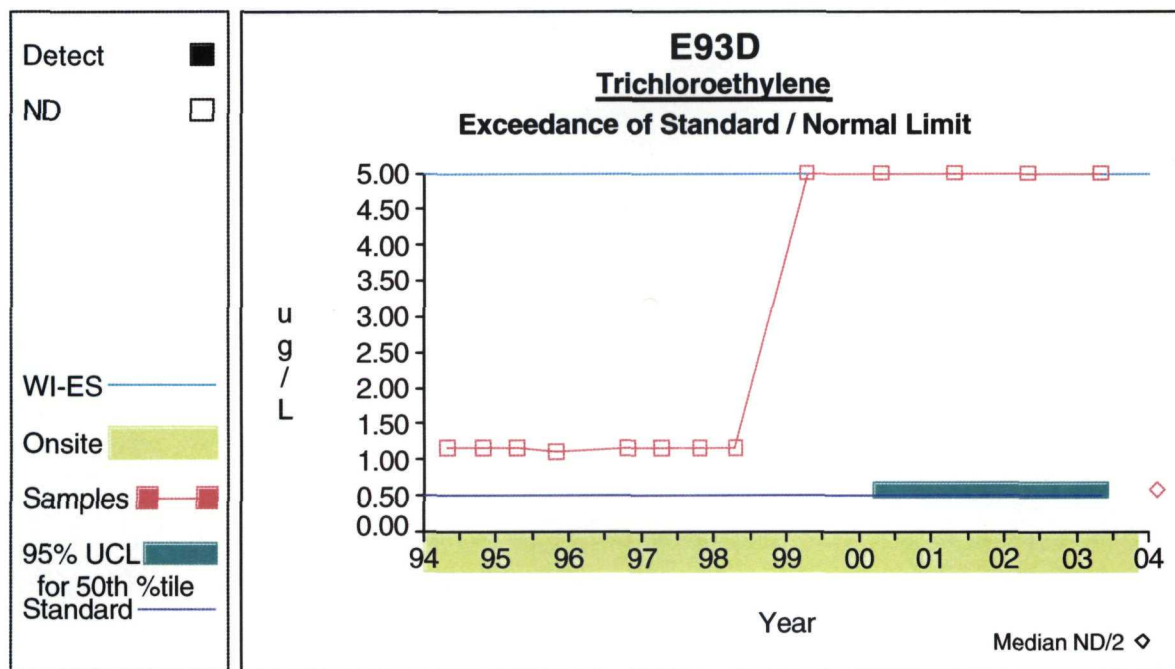
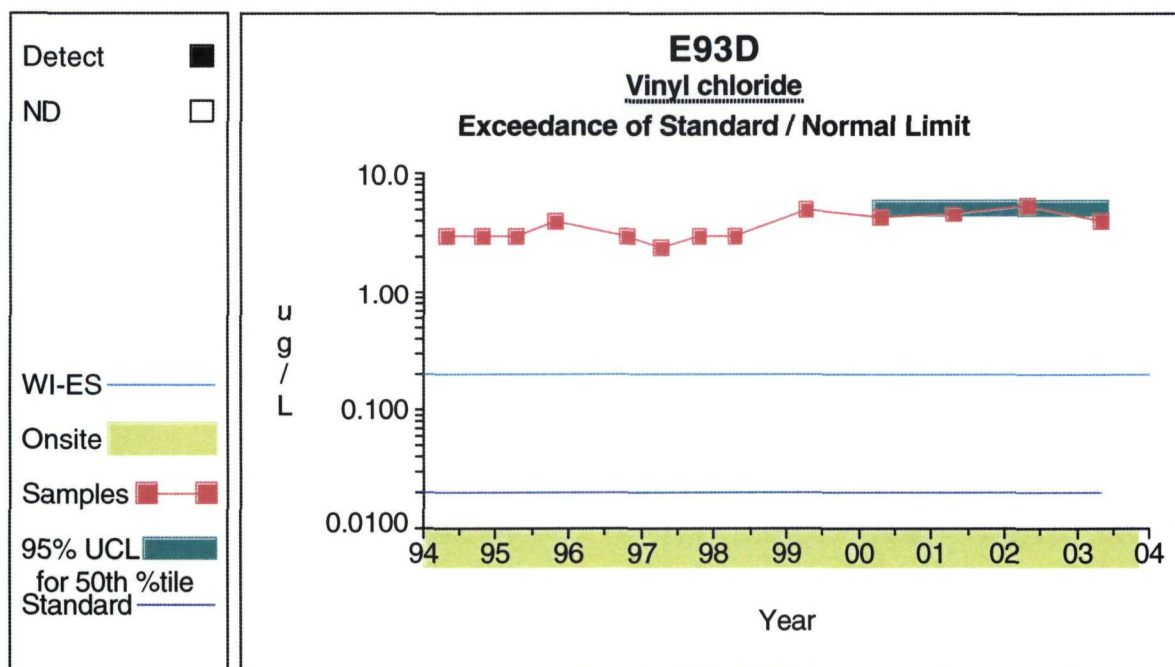
- Detect (Black square)
- ND (White square)
- WI-ES (Blue line)
- Onsite (Green shaded area)
- Samples (Red square)
- 95% UCL for 50th %tile (Blue line)
- Standard (Blue line)

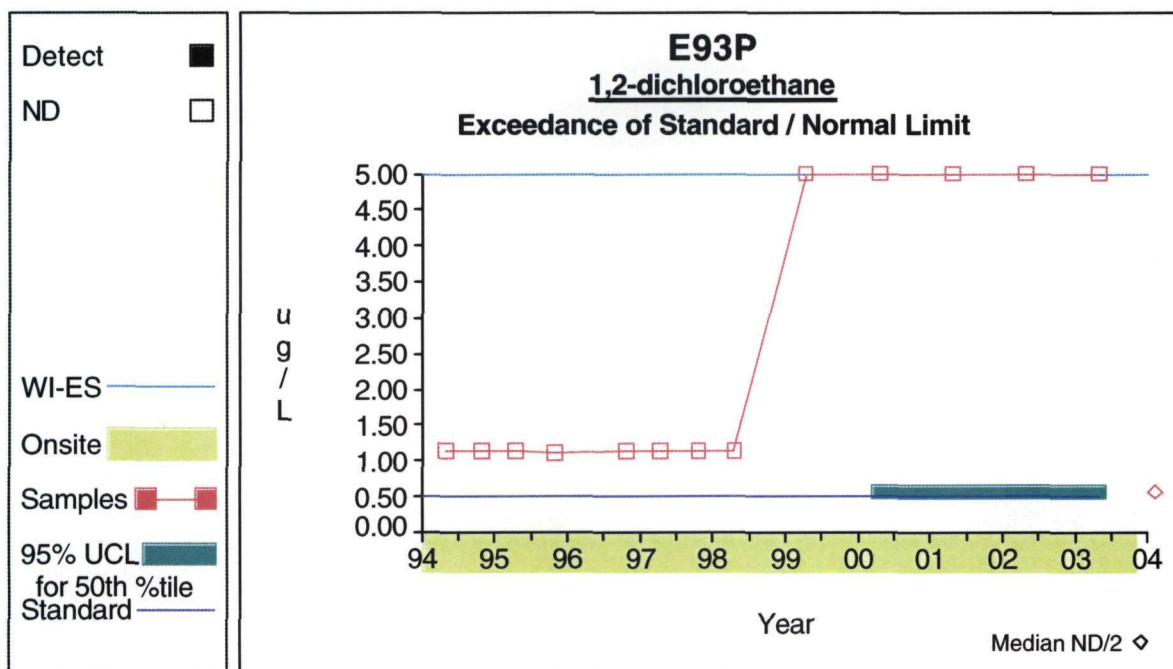
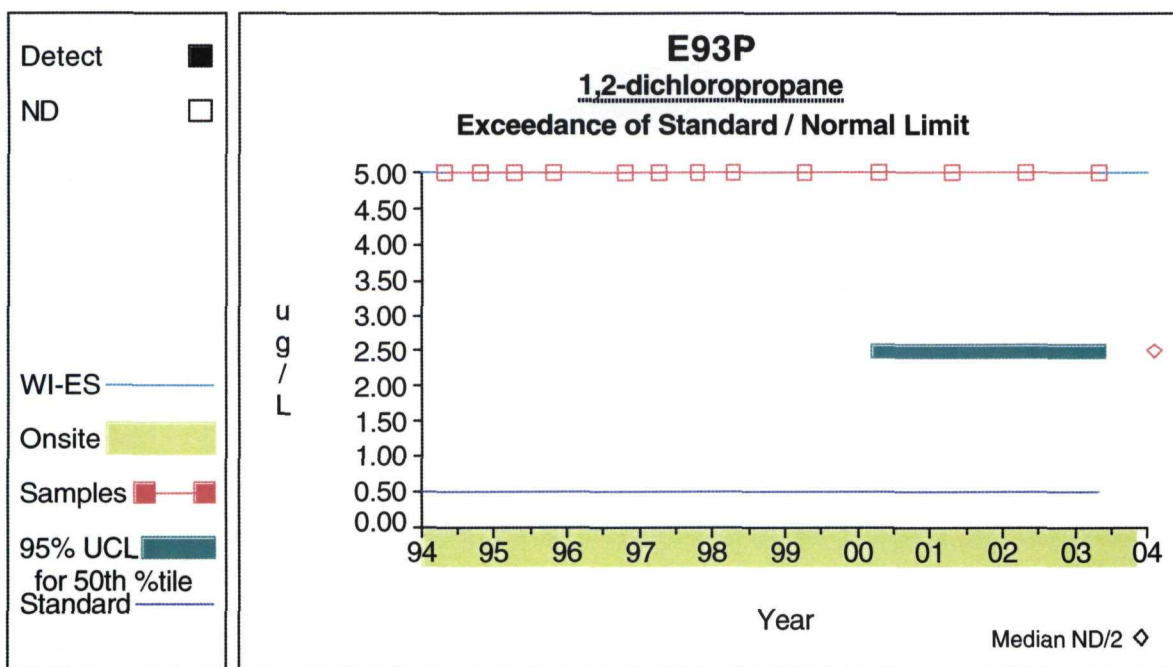
Month / Year	Vinyl chloride ($\mu\text{g} / \text{L}$)
Jan 98	~2.0
Jul 98	~2.0
Jan 99	~2.0
Jul 99	~10.0
Jan 00	~10.0
Jul 00	~10.0
Jan 01	~10.0
Jul 01	~10.0
Jan 02	~10.0
Jul 02	~10.0
Jan 03	~10.0
Jul 03	~10.0
Jan 04	~10.0

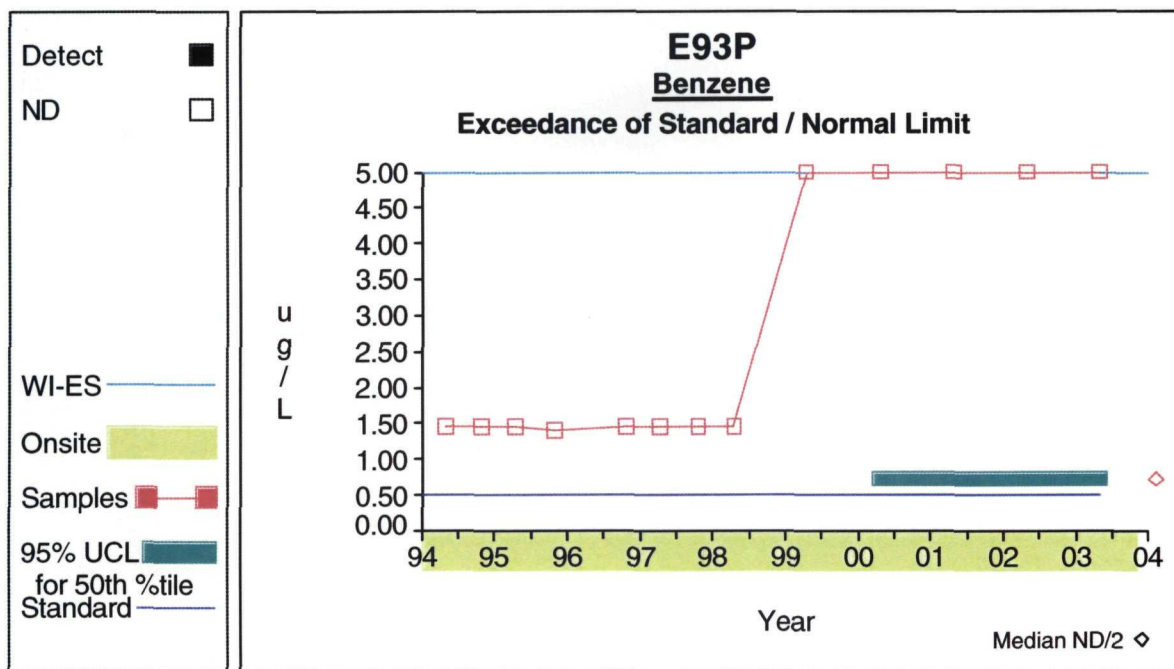
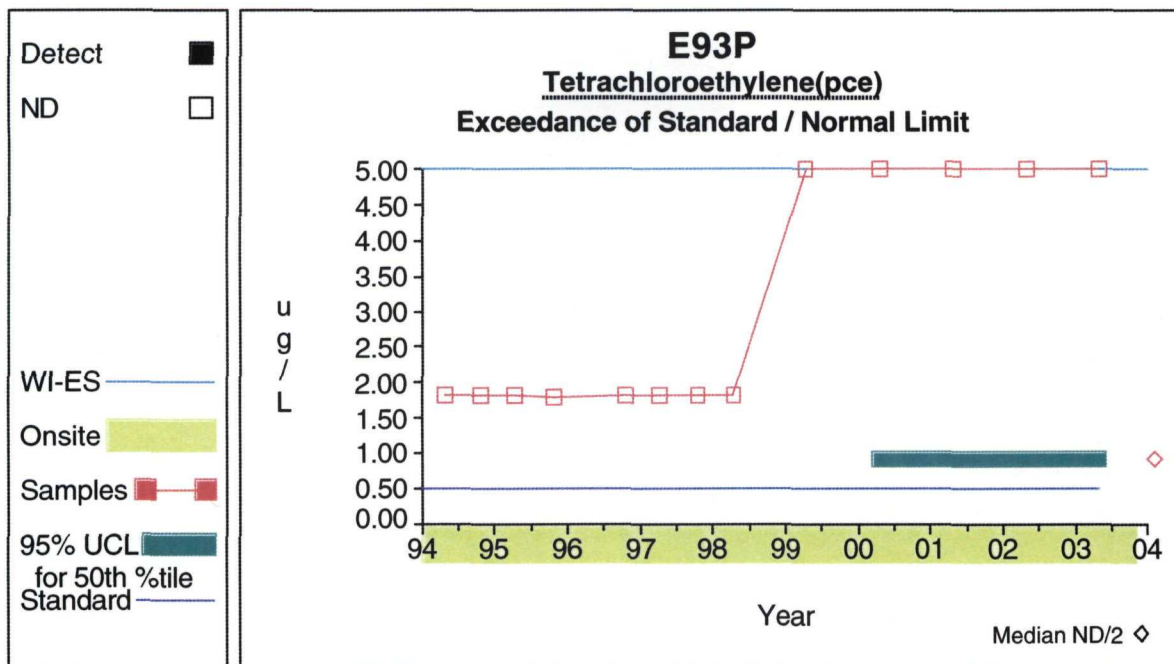
Prepared by: U.S. DOT \ RSPA \ Volpe Center

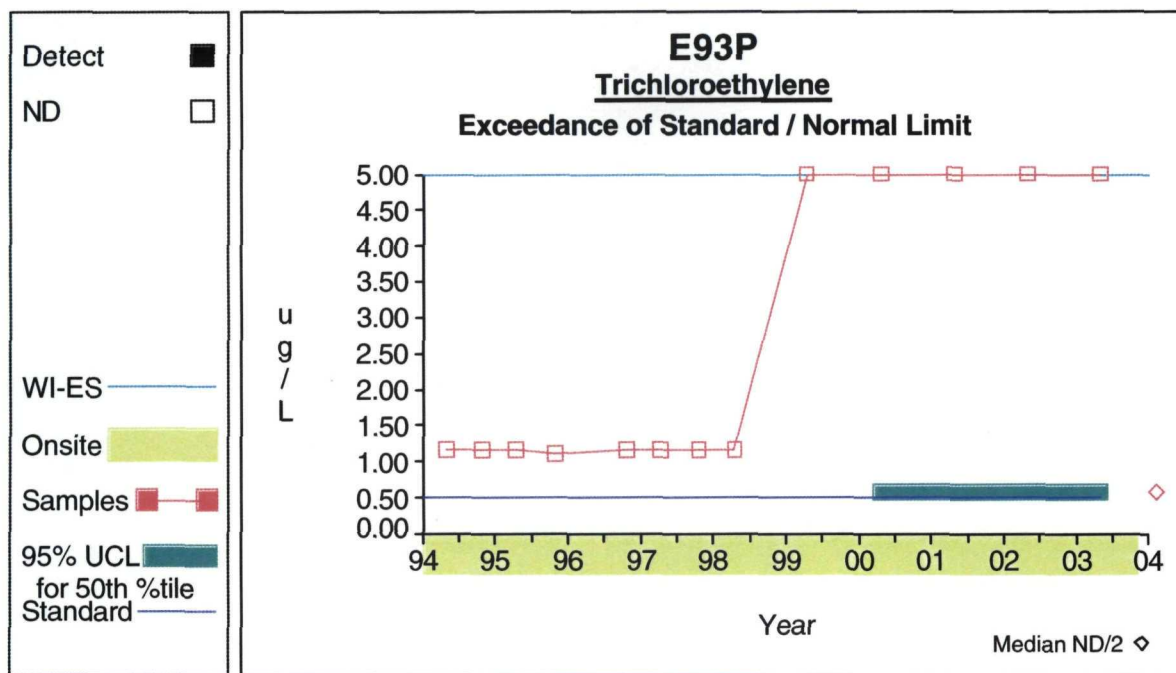
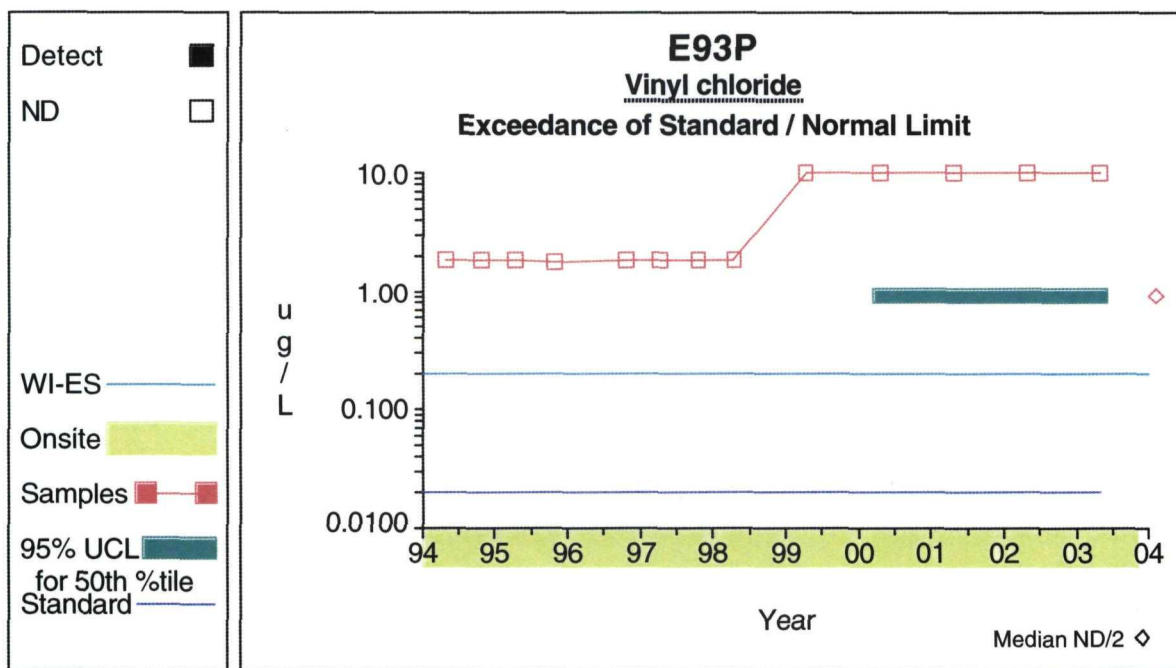
Comparison to Standard**Graph 111****Graph 112**

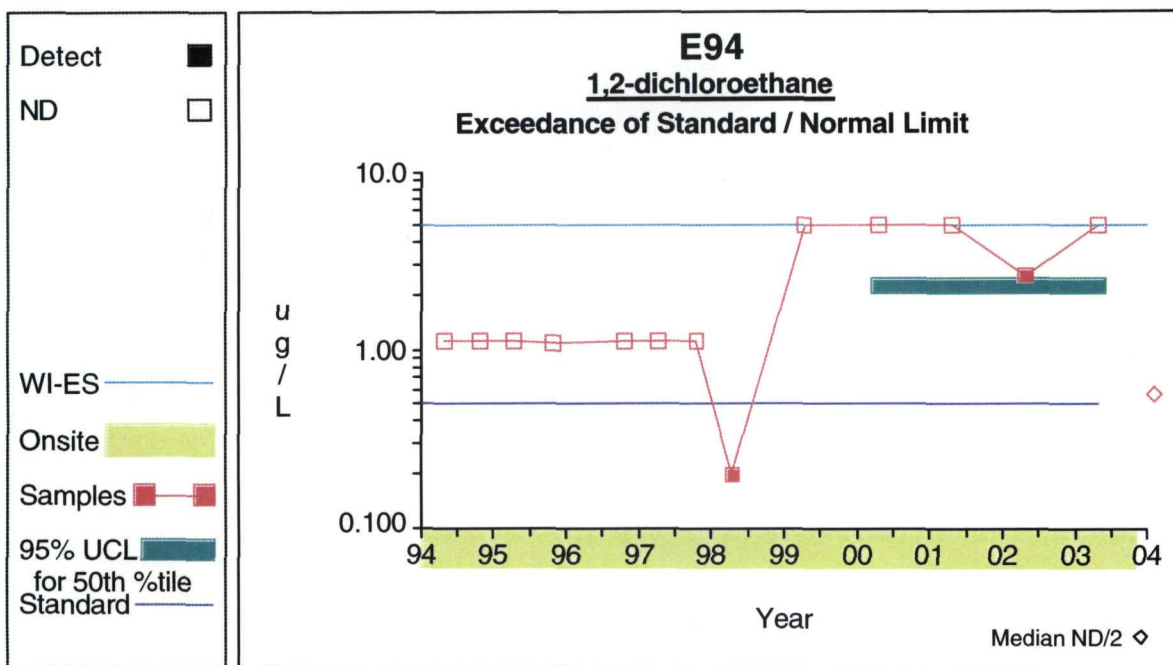
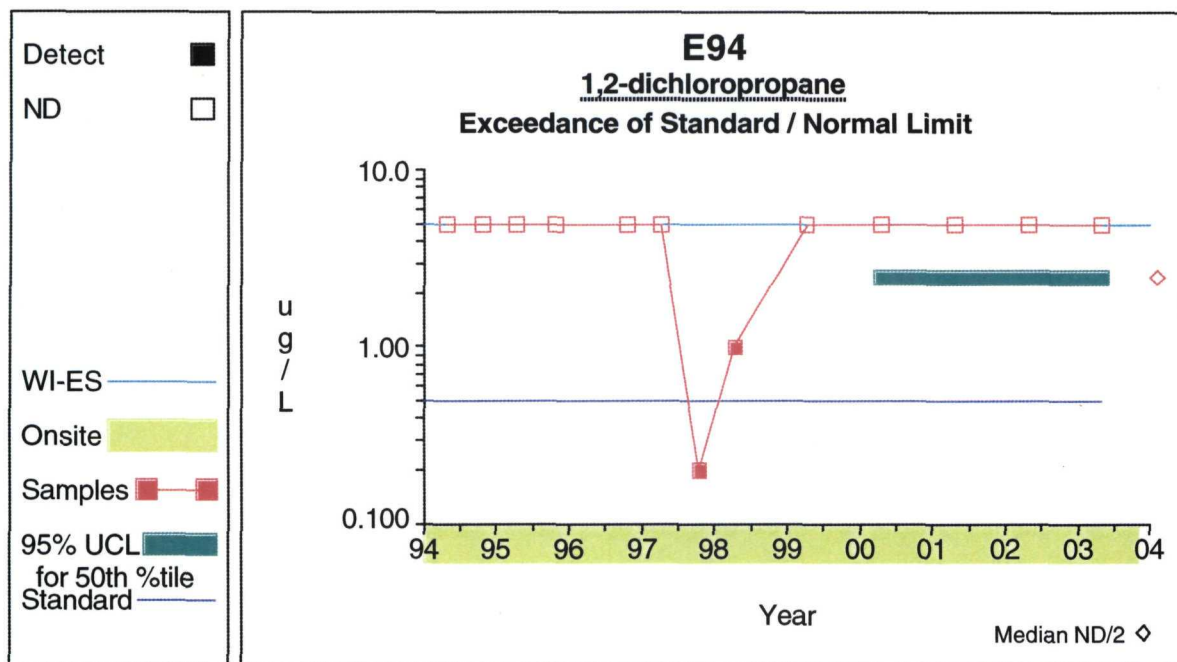
Comparison to Standard**Graph 113****Graph 118**

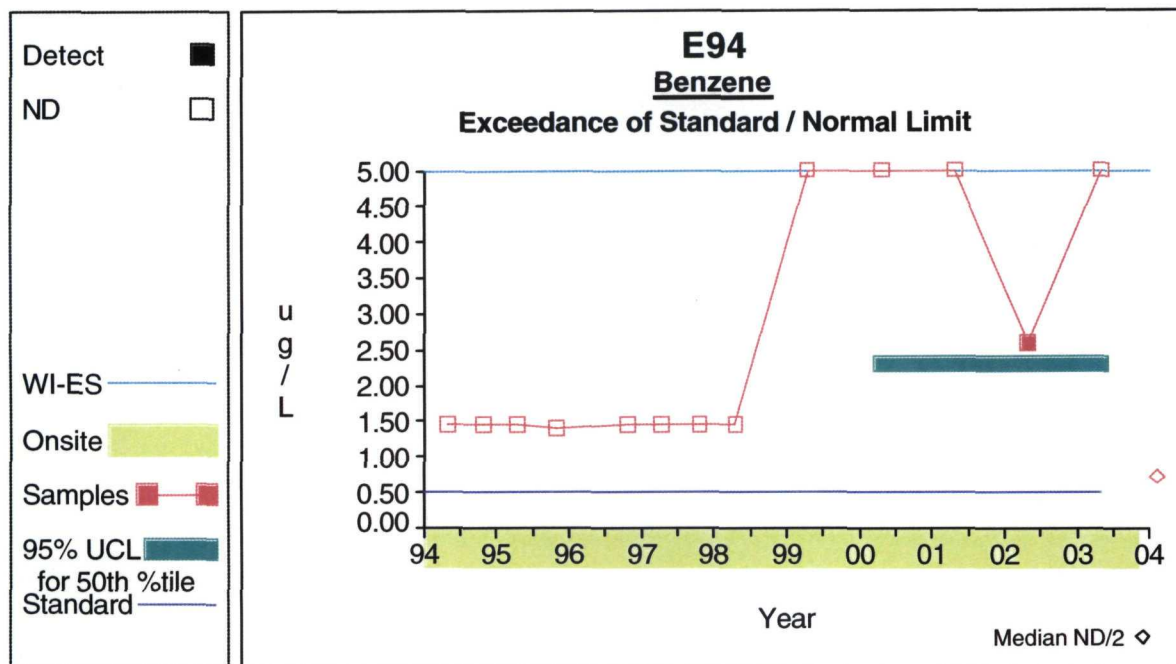
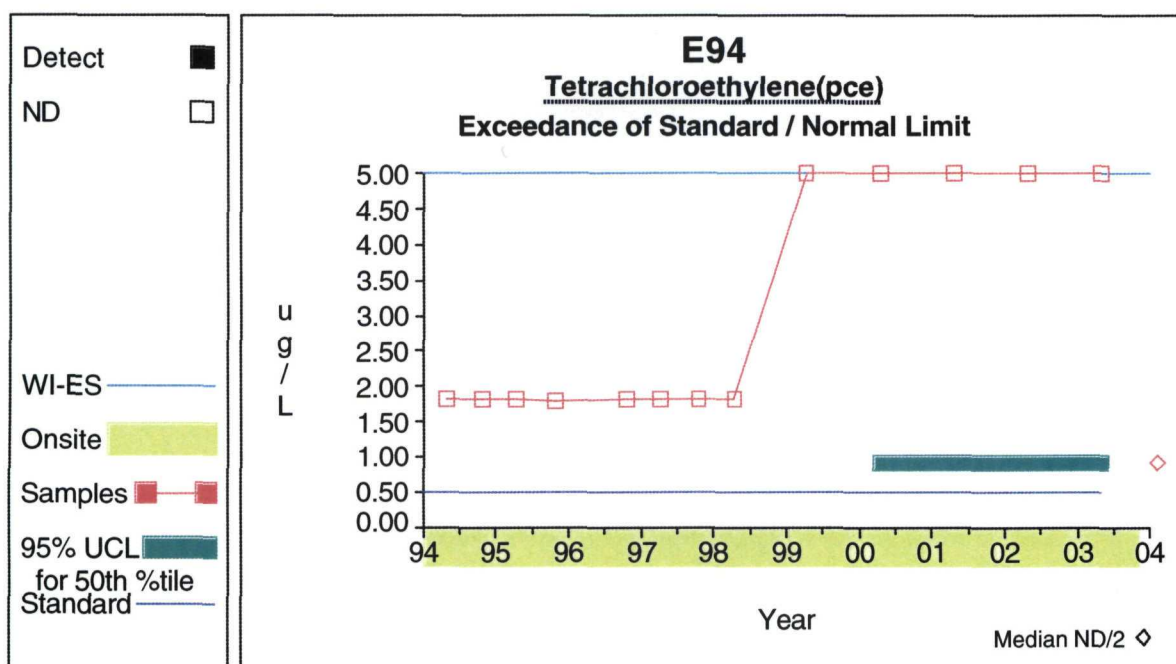
Comparison to Standard**Graph 119****Graph 120**

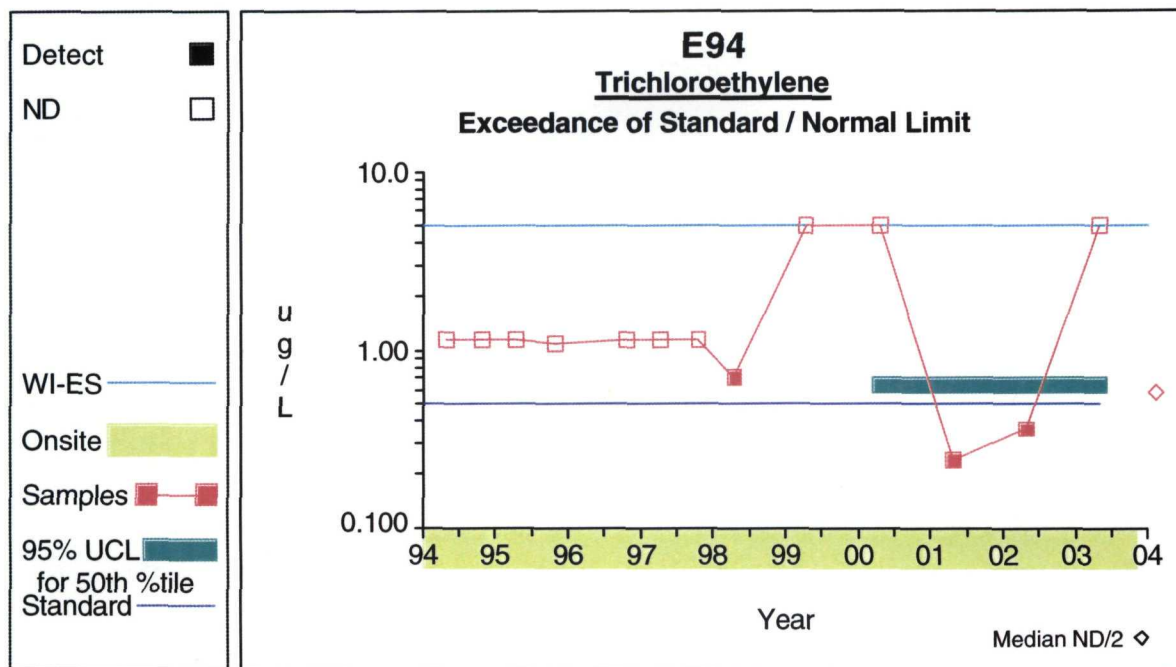
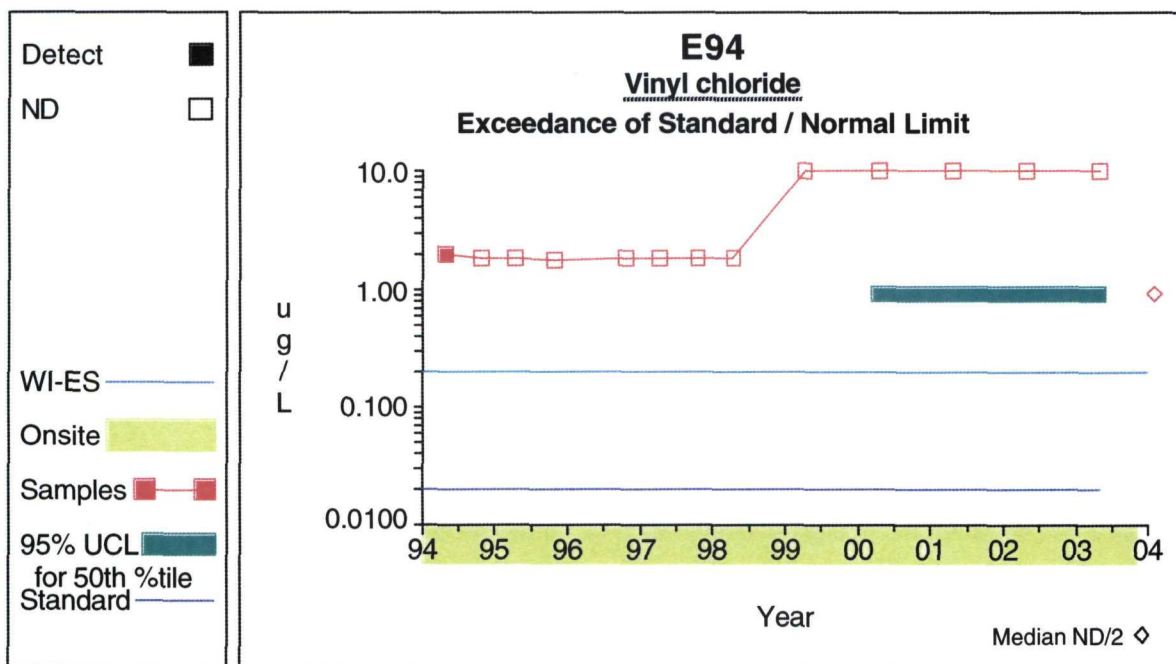
Comparison to Standard**Graph 121****Graph 122**

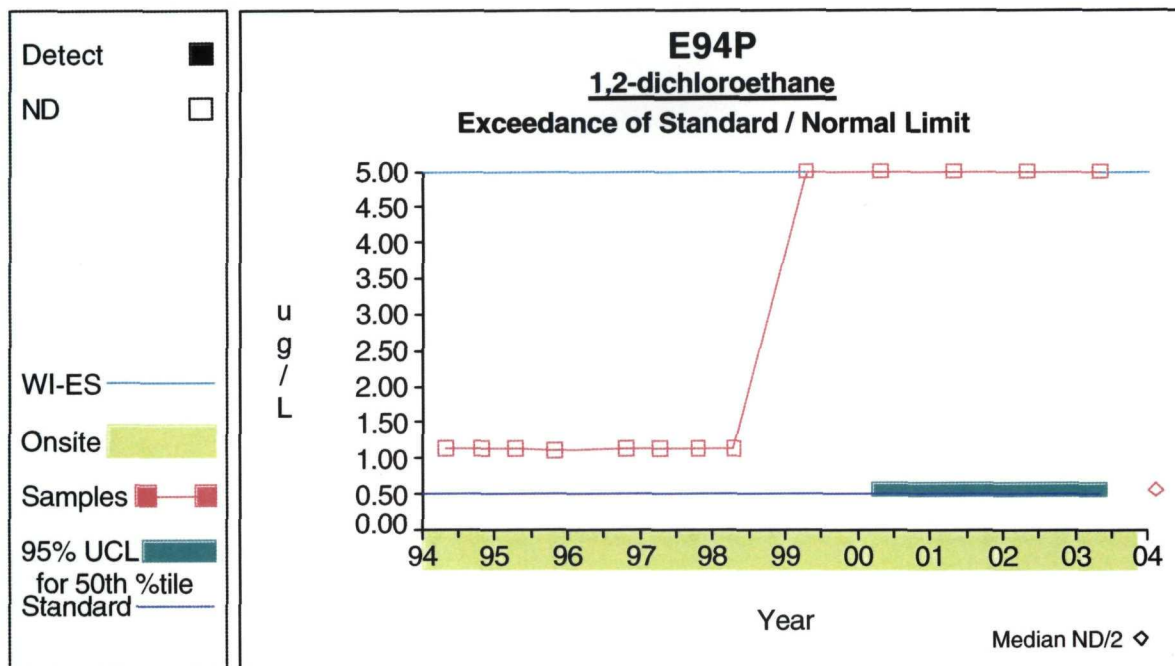
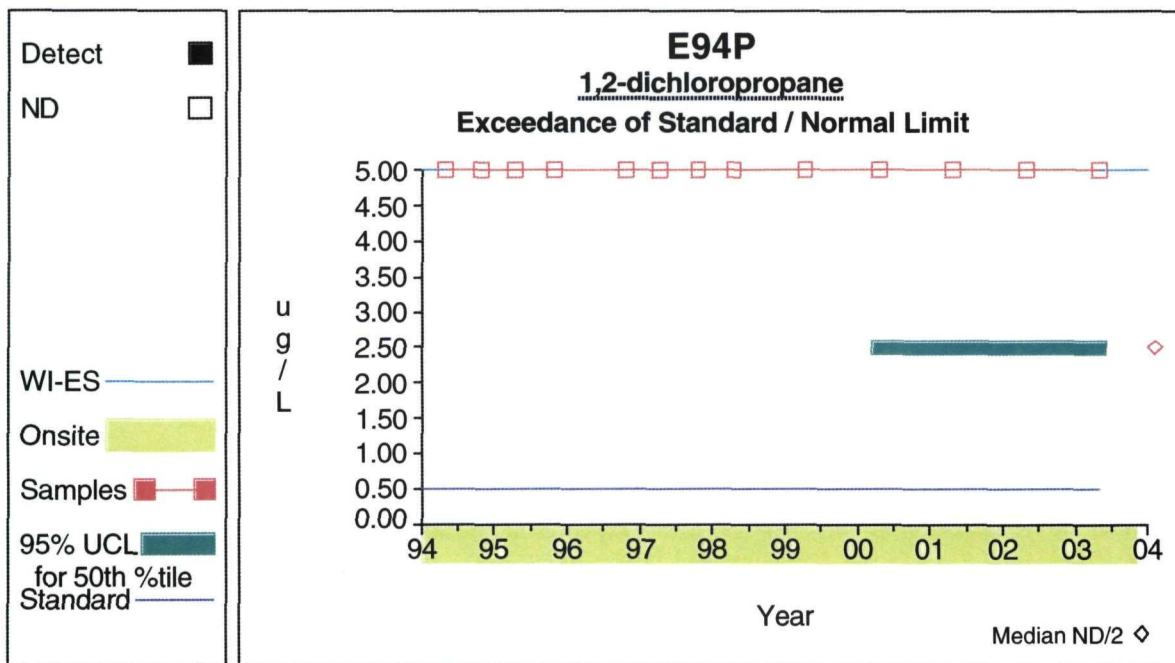
Comparison to Standard**Graph 123****Graph 128**

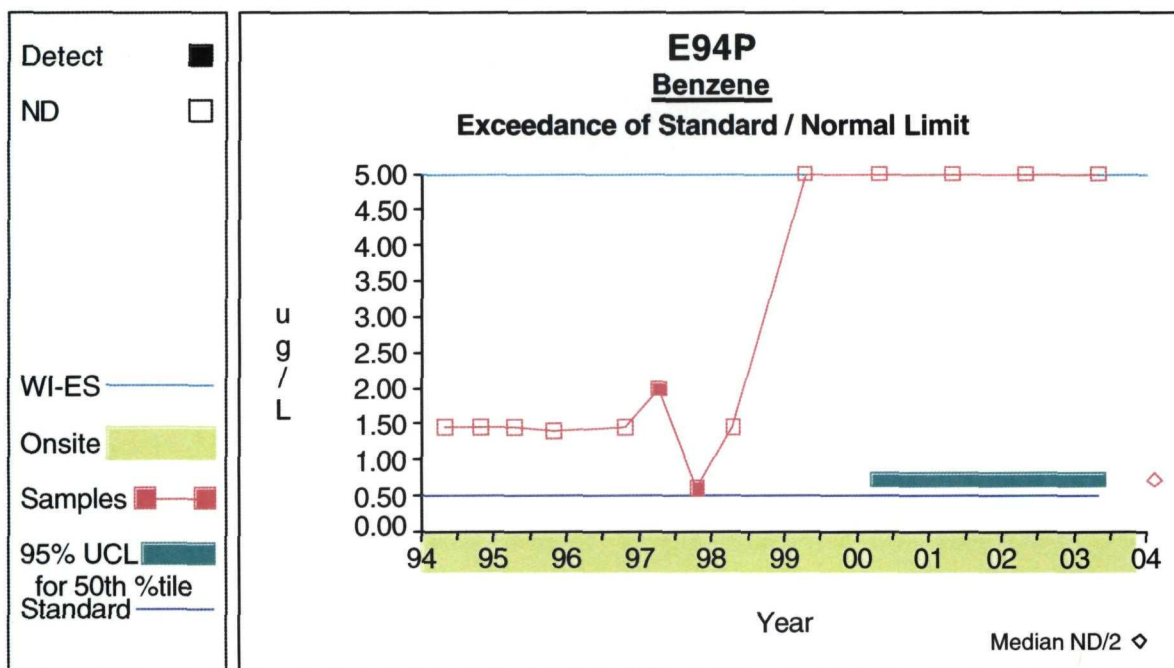
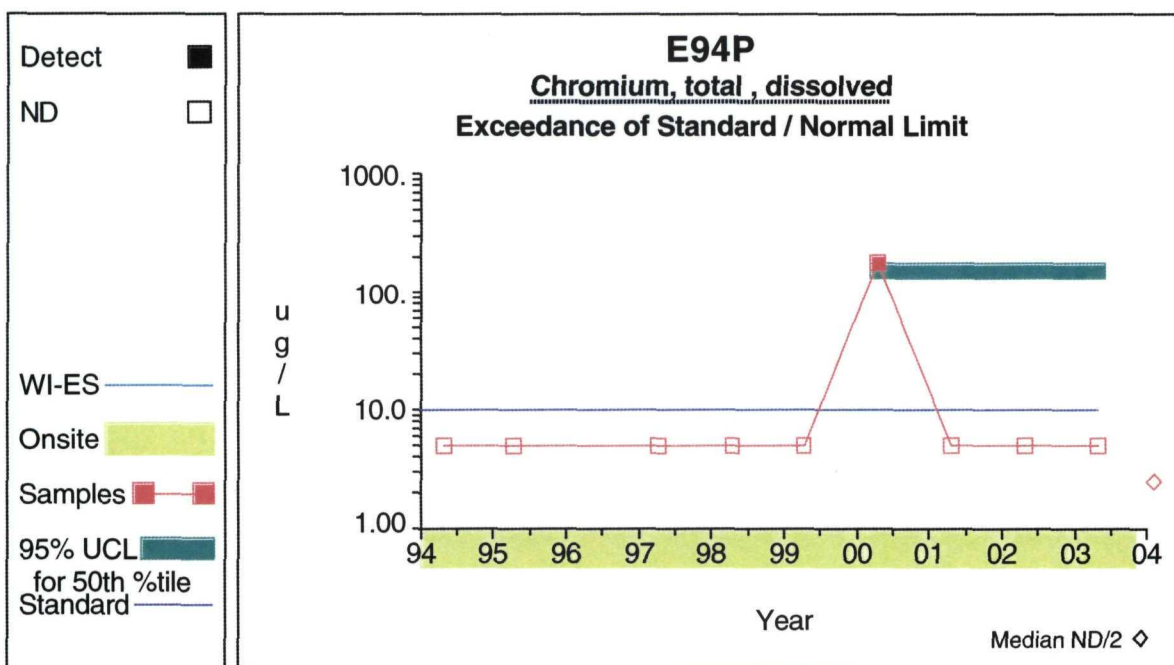
Comparison to Standard**Graph 129****Graph 130**

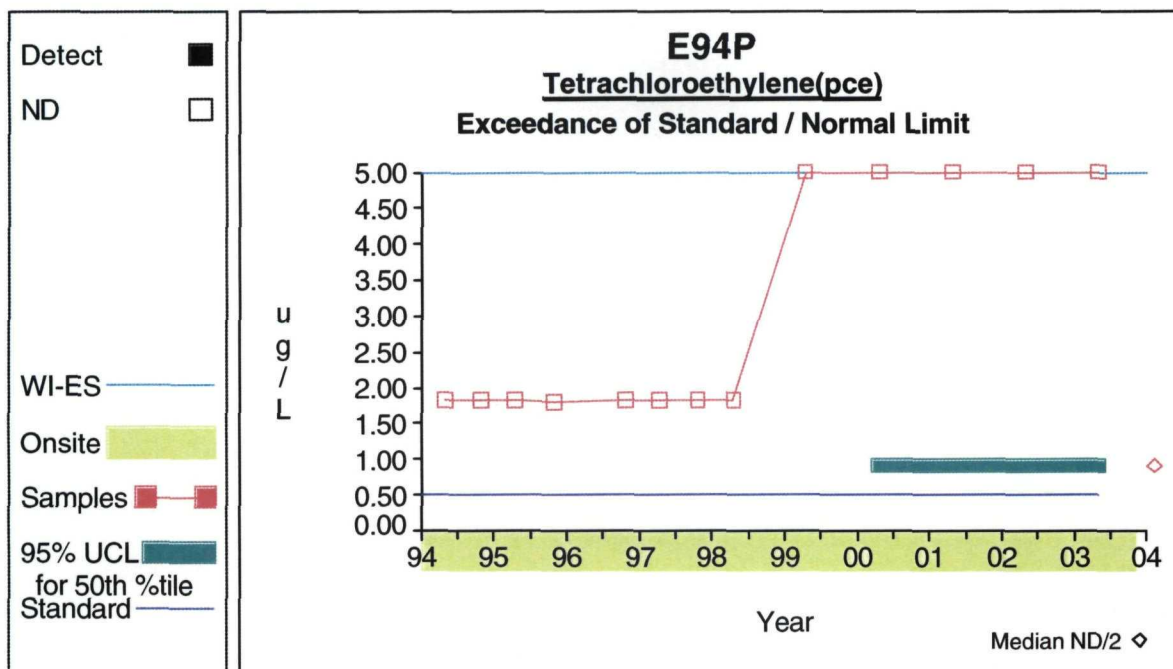
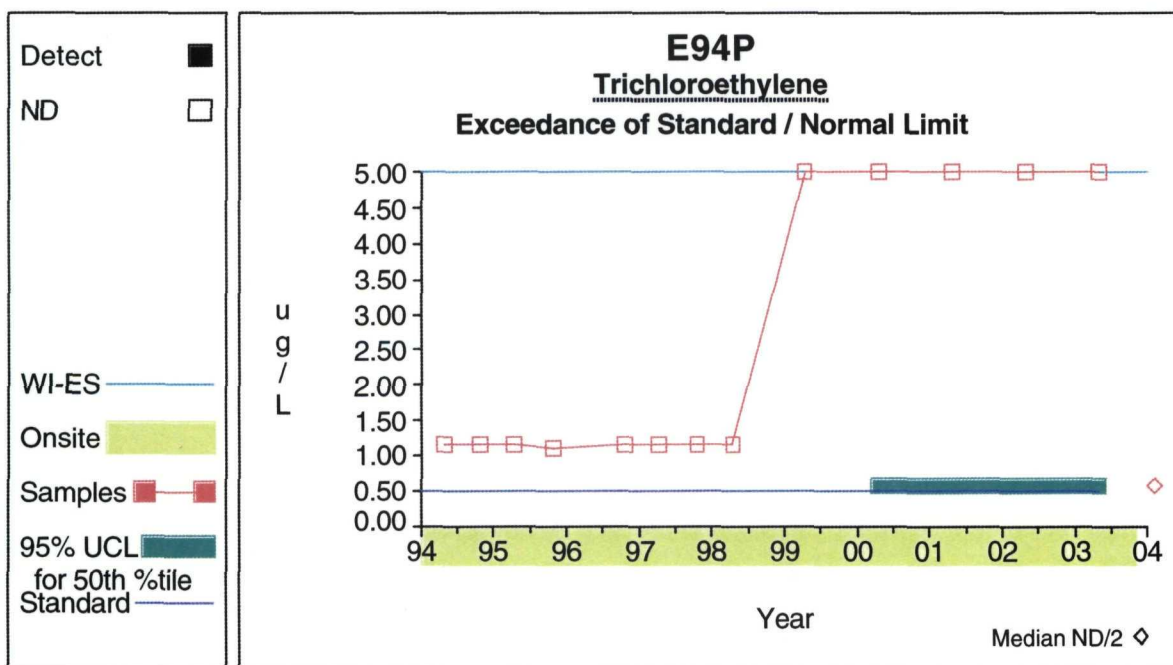
Comparison to Standard**Graph 131****Graph 132**

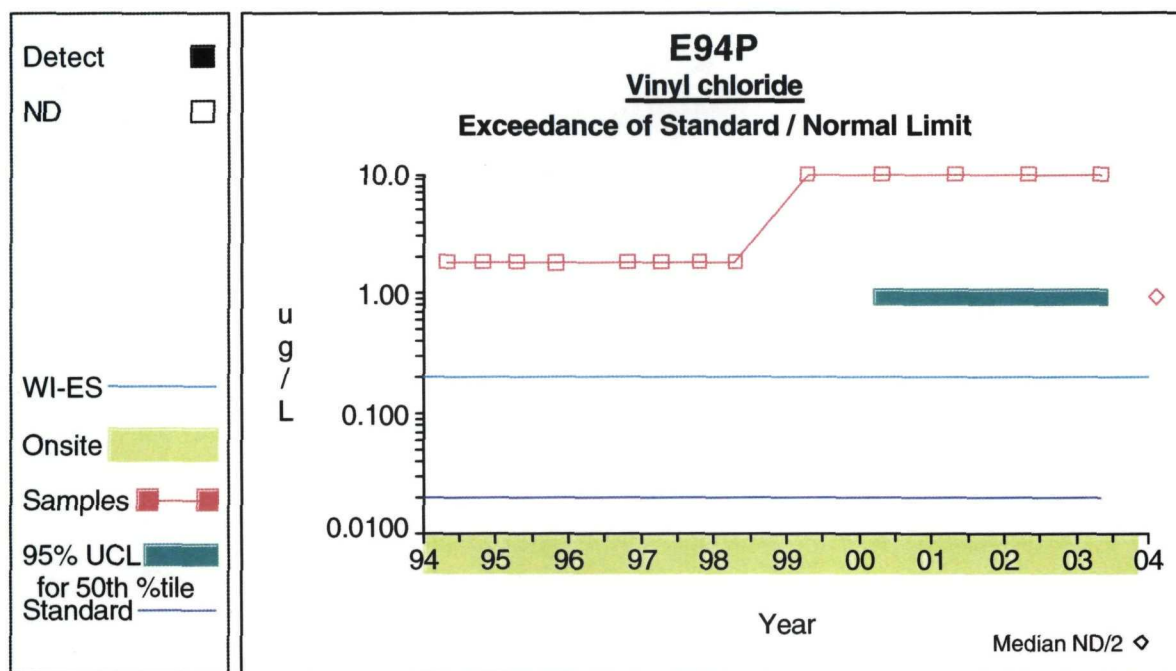
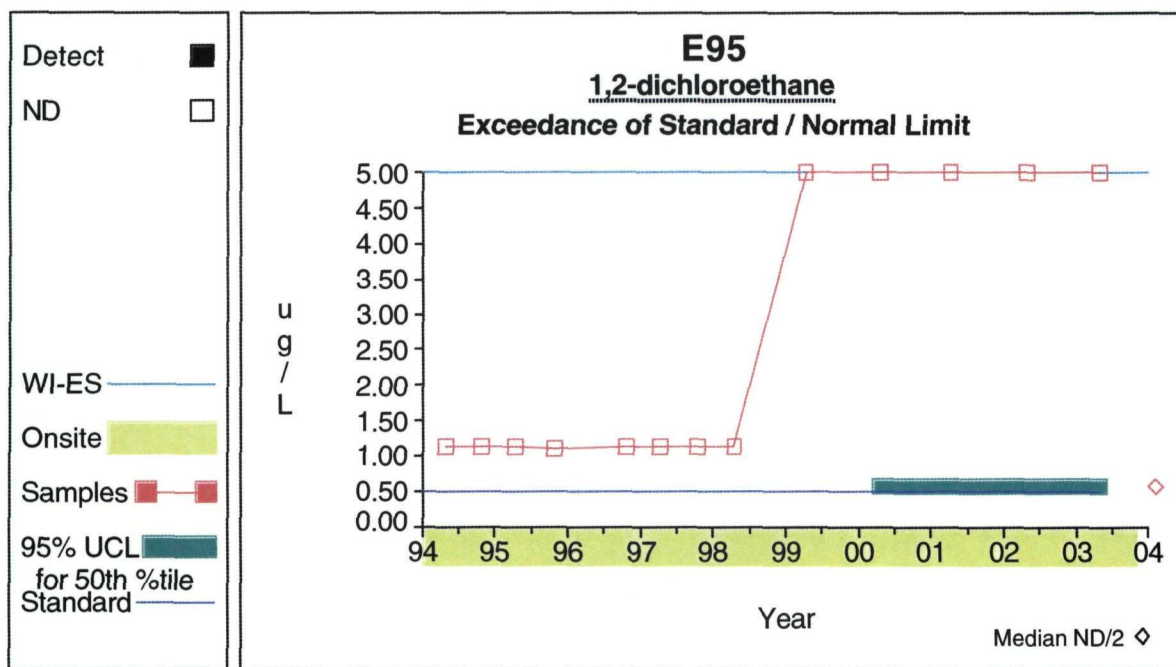
Comparison to Standard**Graph 133****Graph 138**

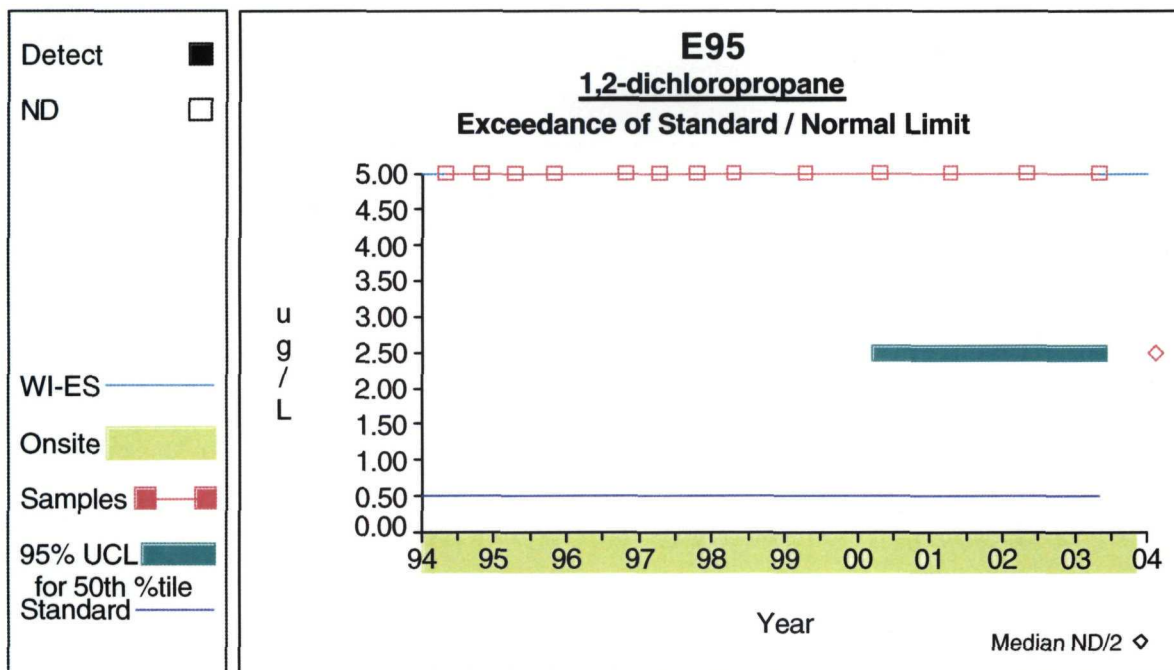
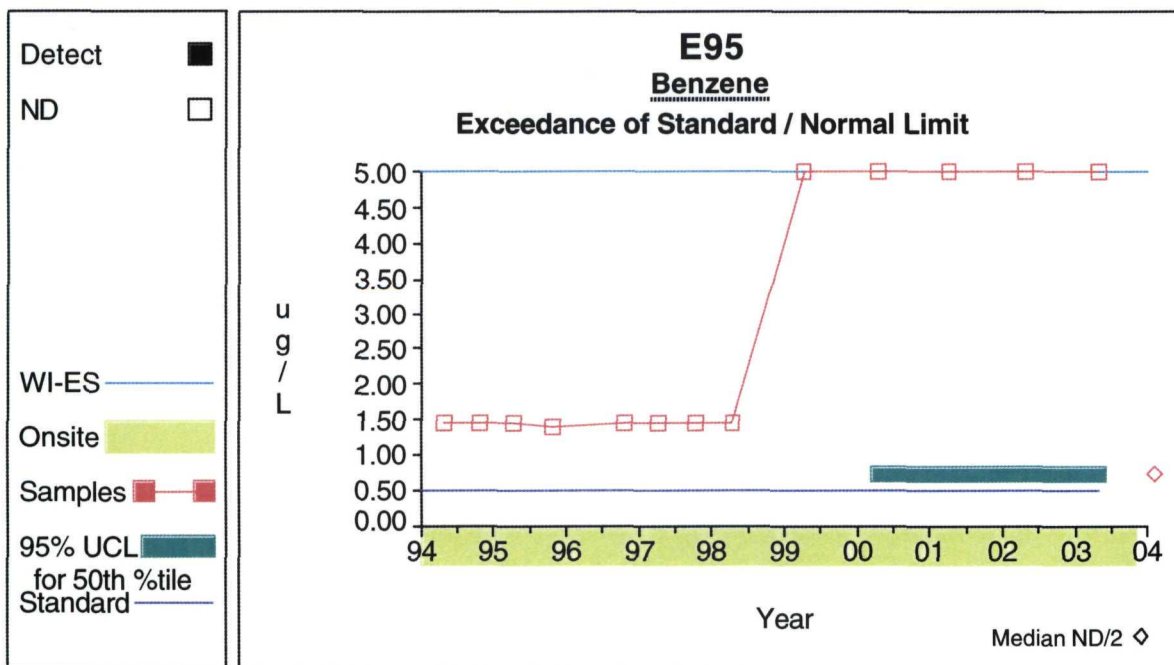
Comparison to Standard**Graph 139****Graph 140**

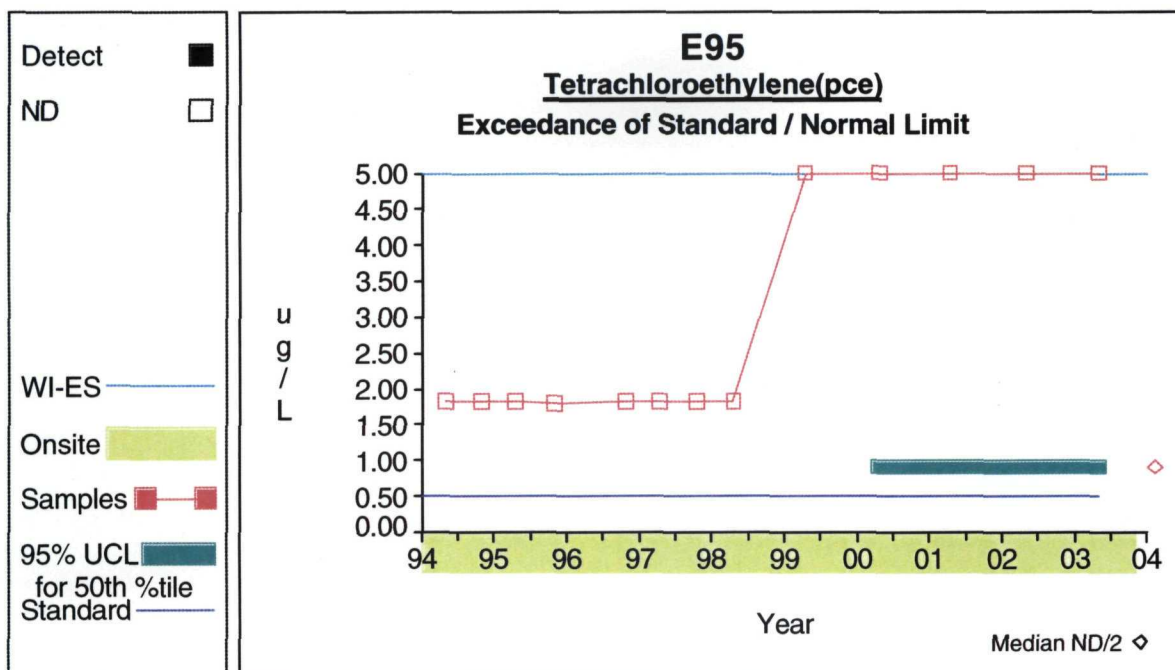
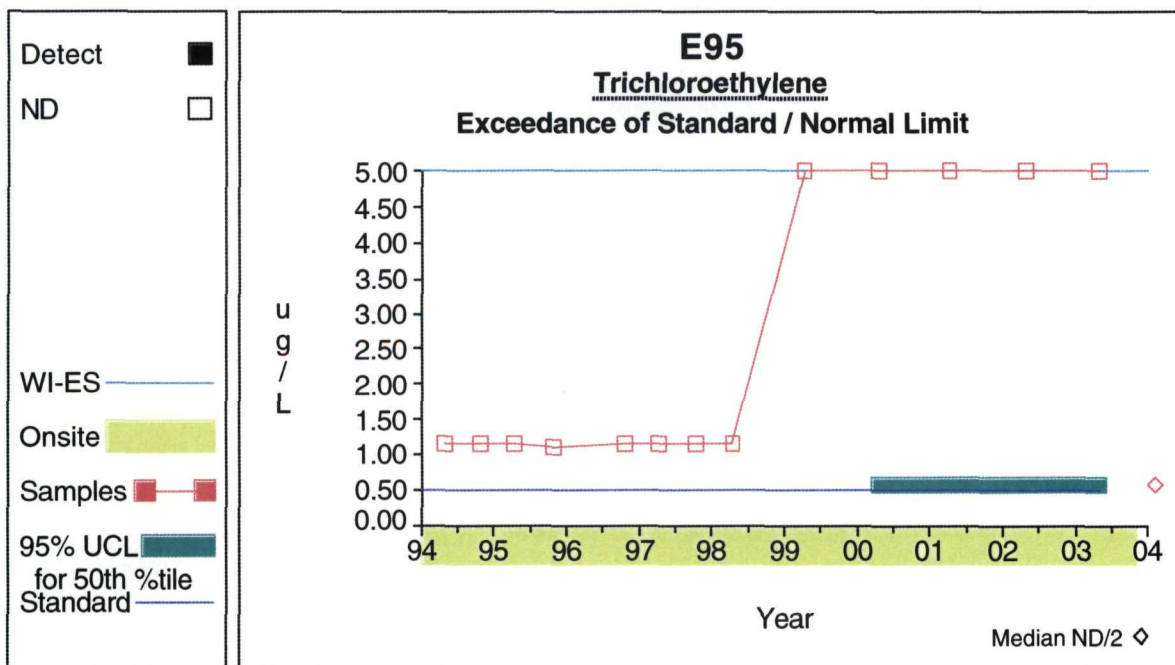
Comparison to Standard**Graph 141****Graph 142**

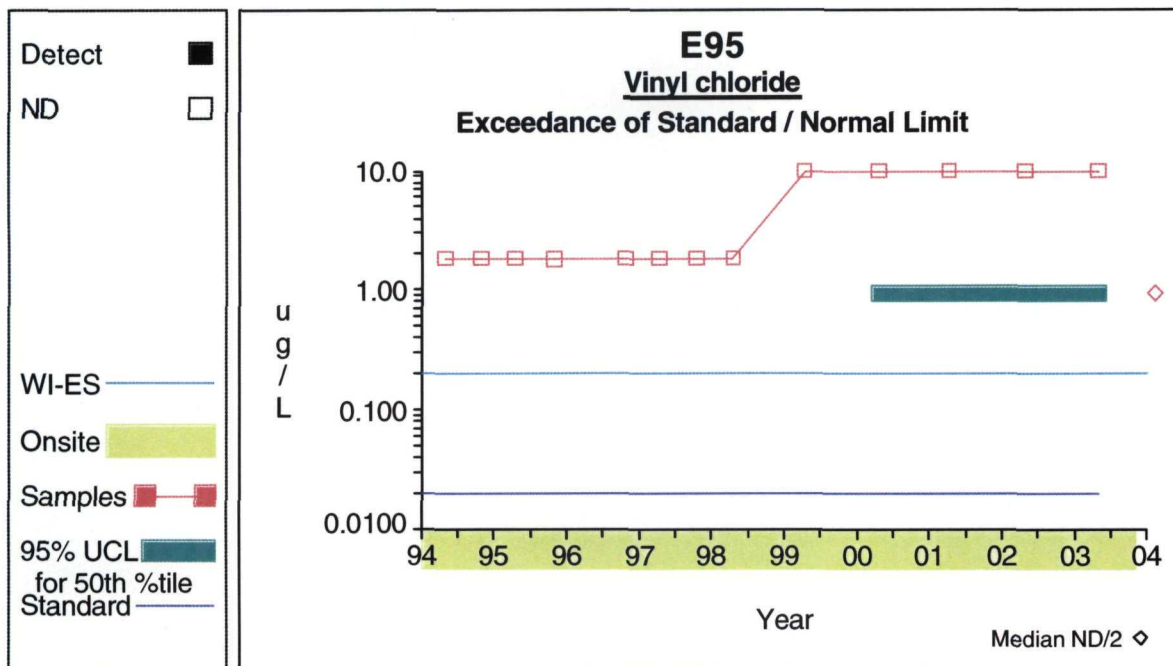
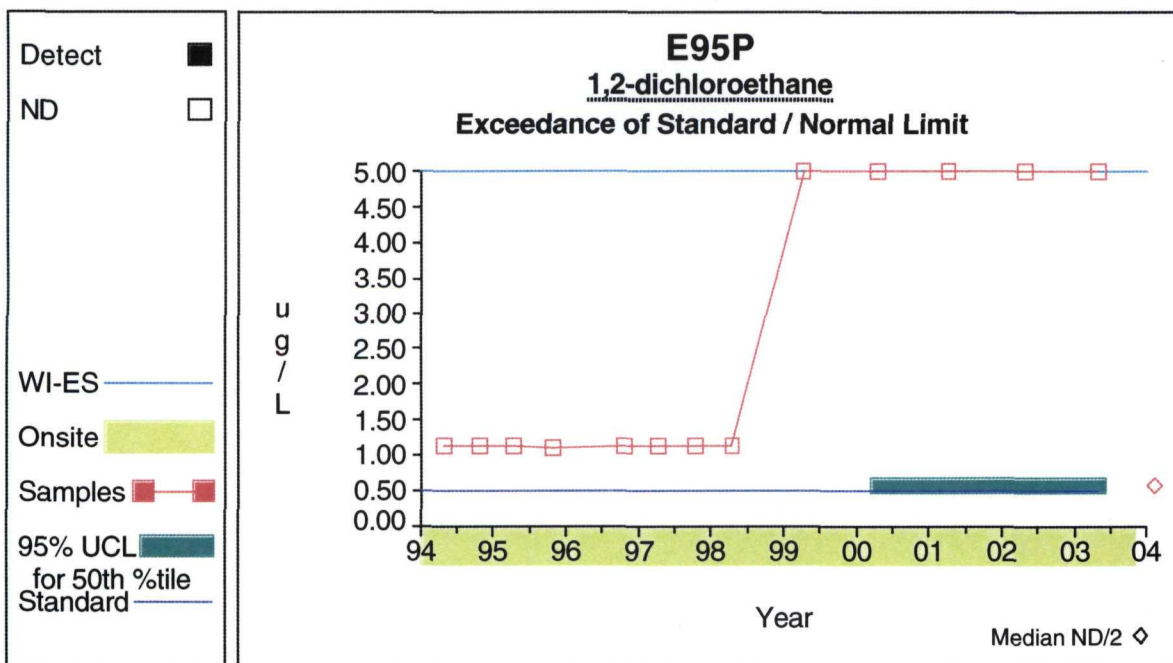
Comparison to Standard**Graph 143****Graph 145**

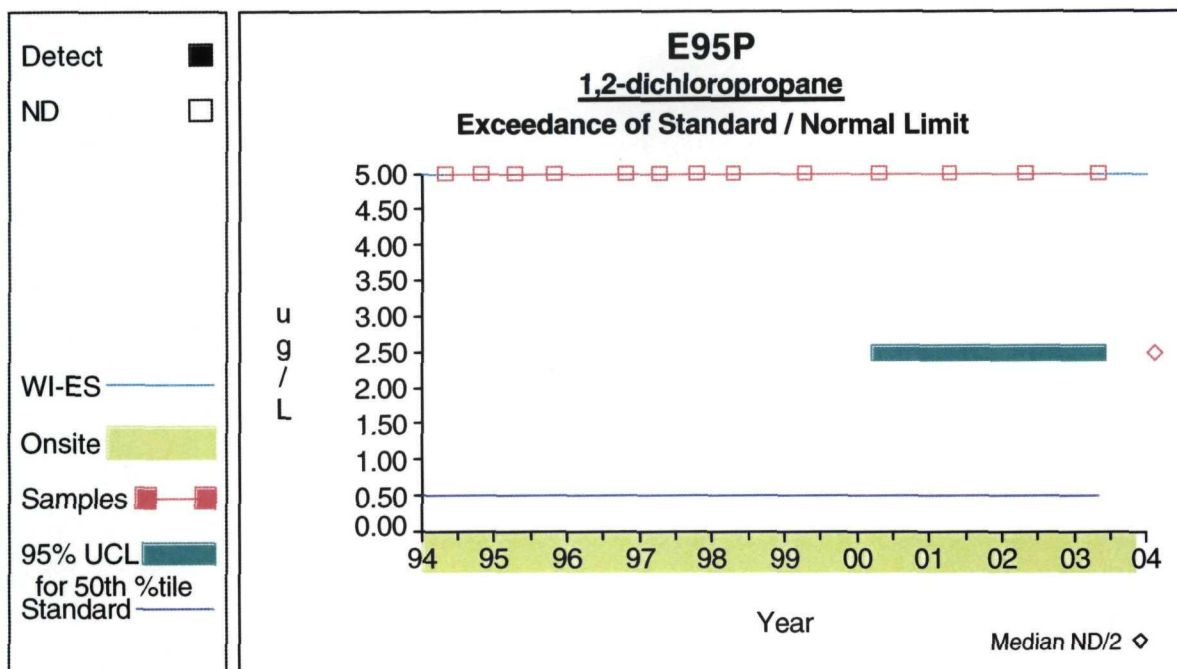
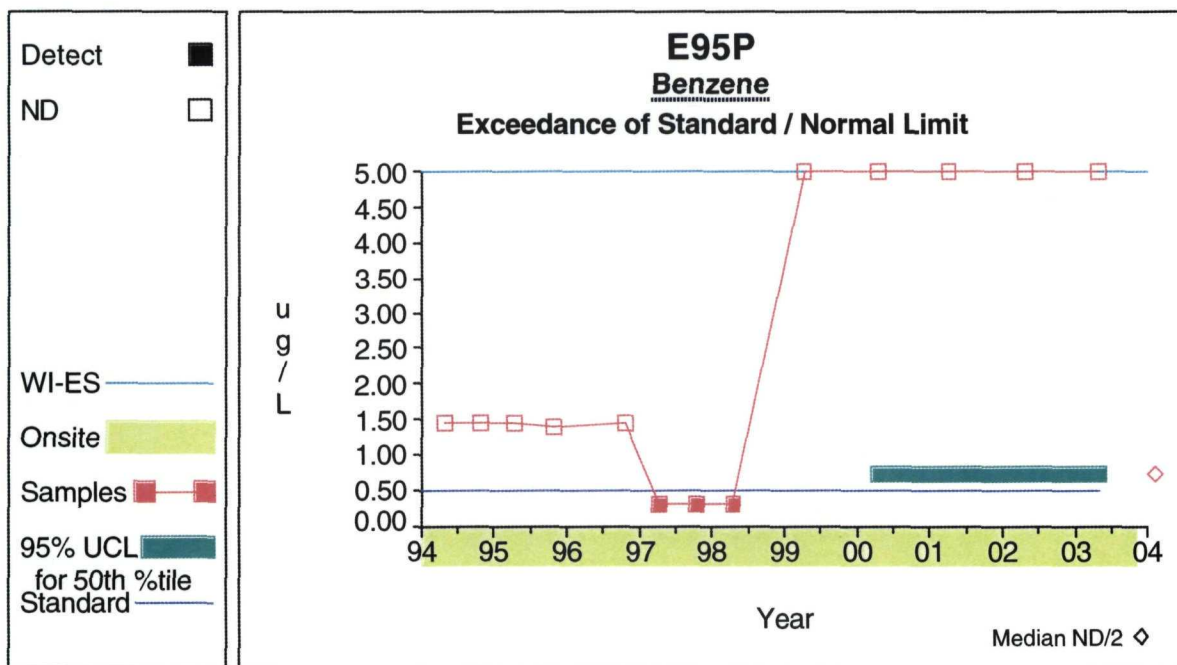
Comparison to Standard**Graph 148****Graph 149**

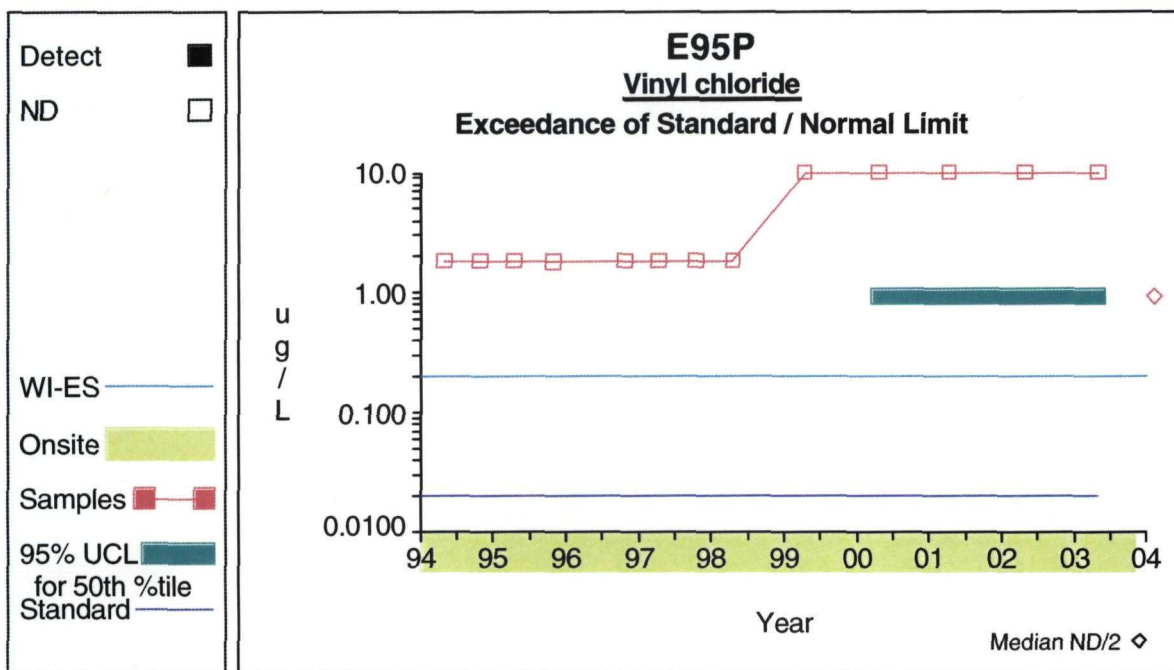
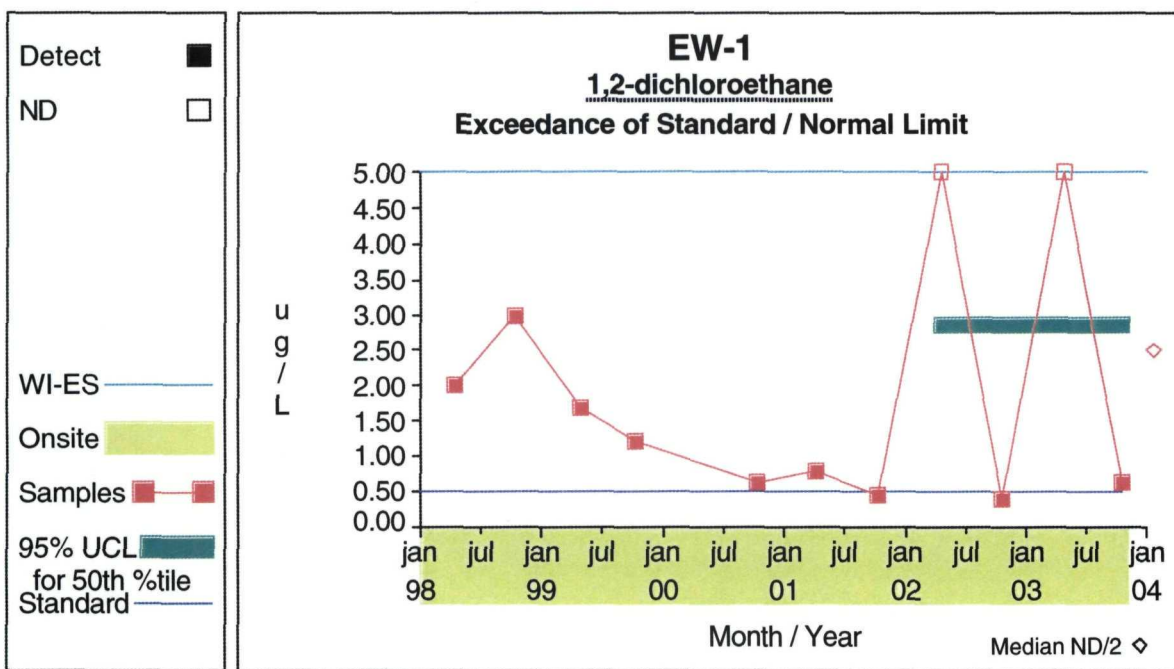
Comparison to Standard**Graph 150****Graph 151**

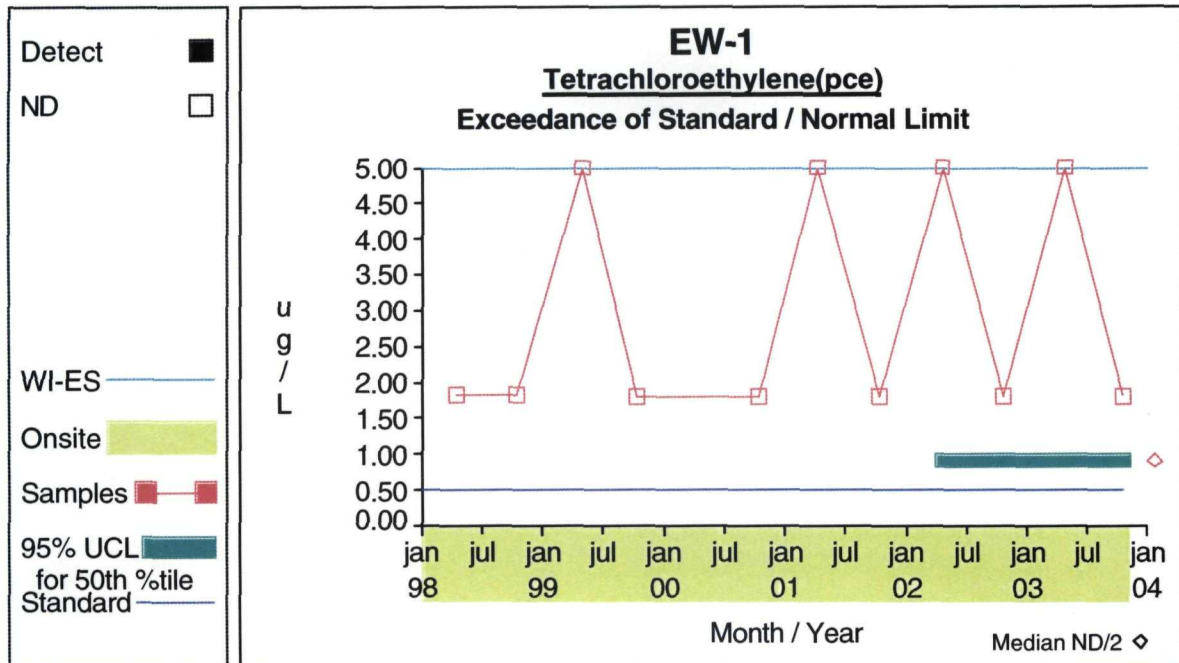
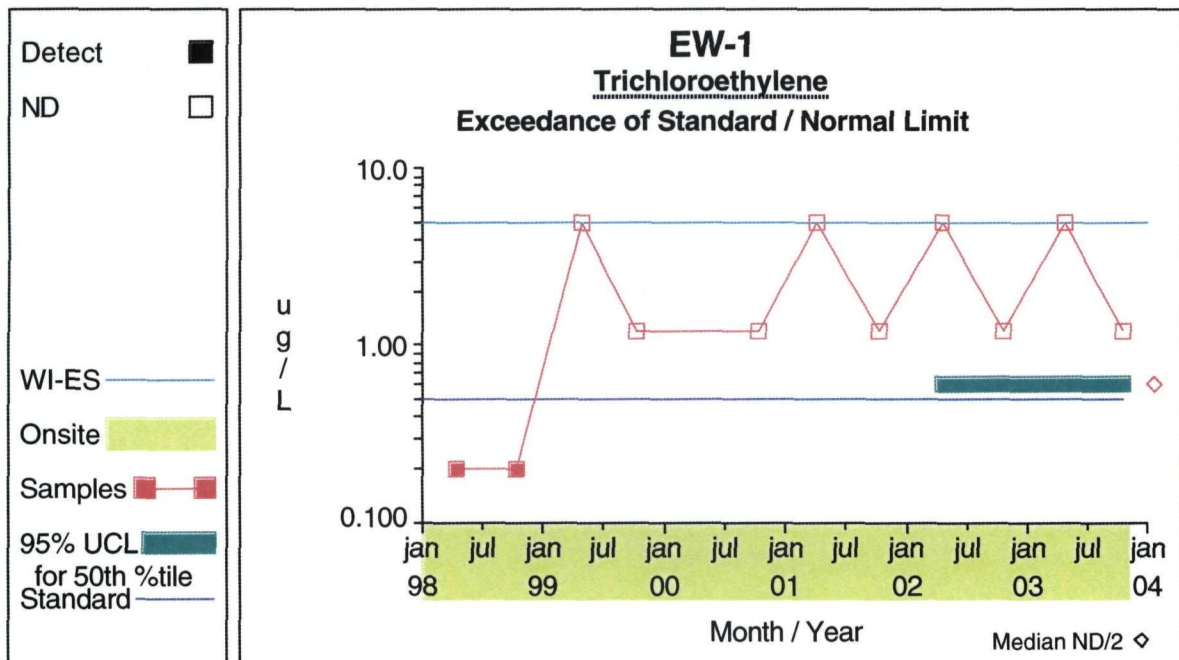
Comparison to Standard**Graph 152****Graph 153**

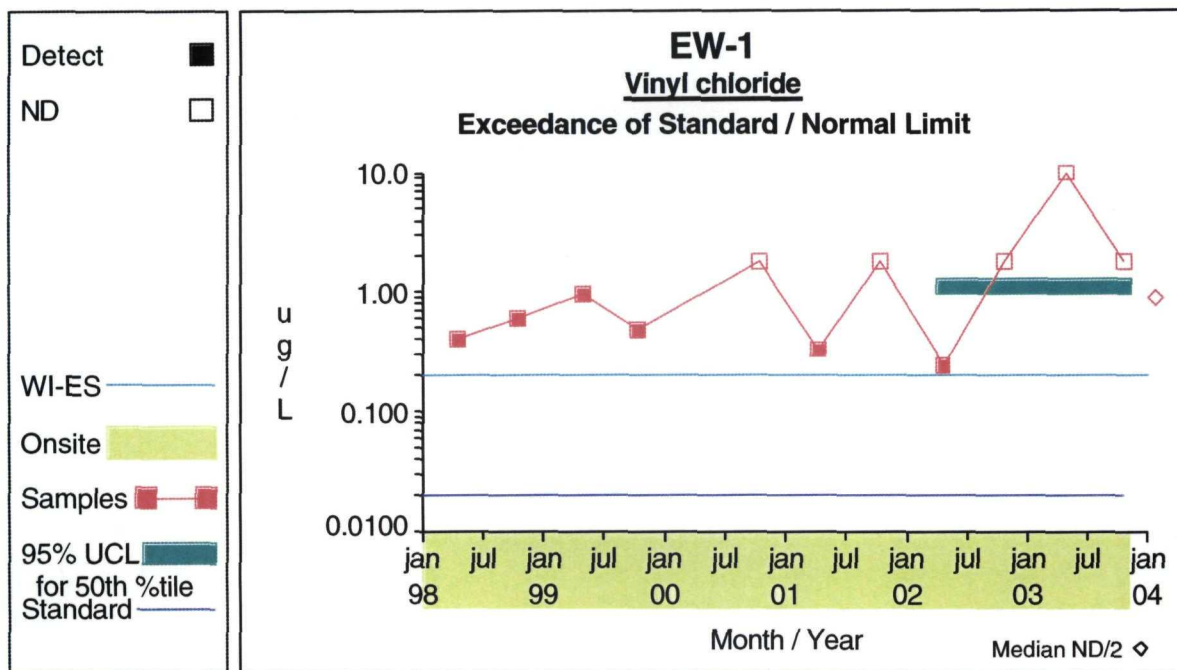
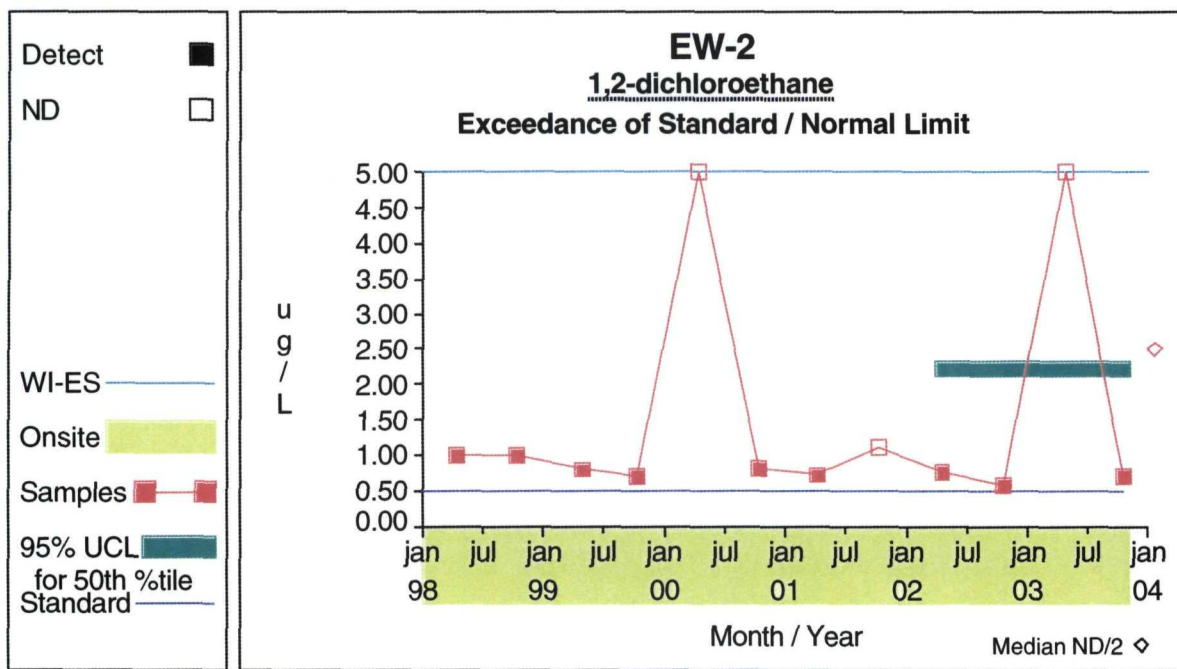
Comparison to Standard**Graph 158****Graph 159**

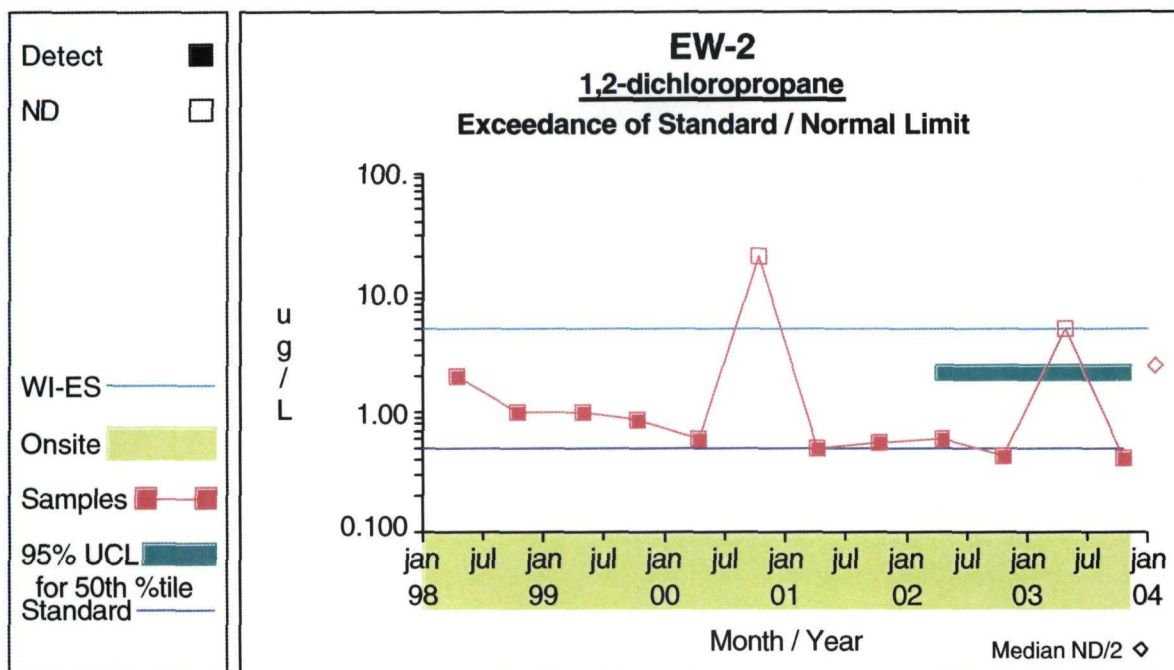
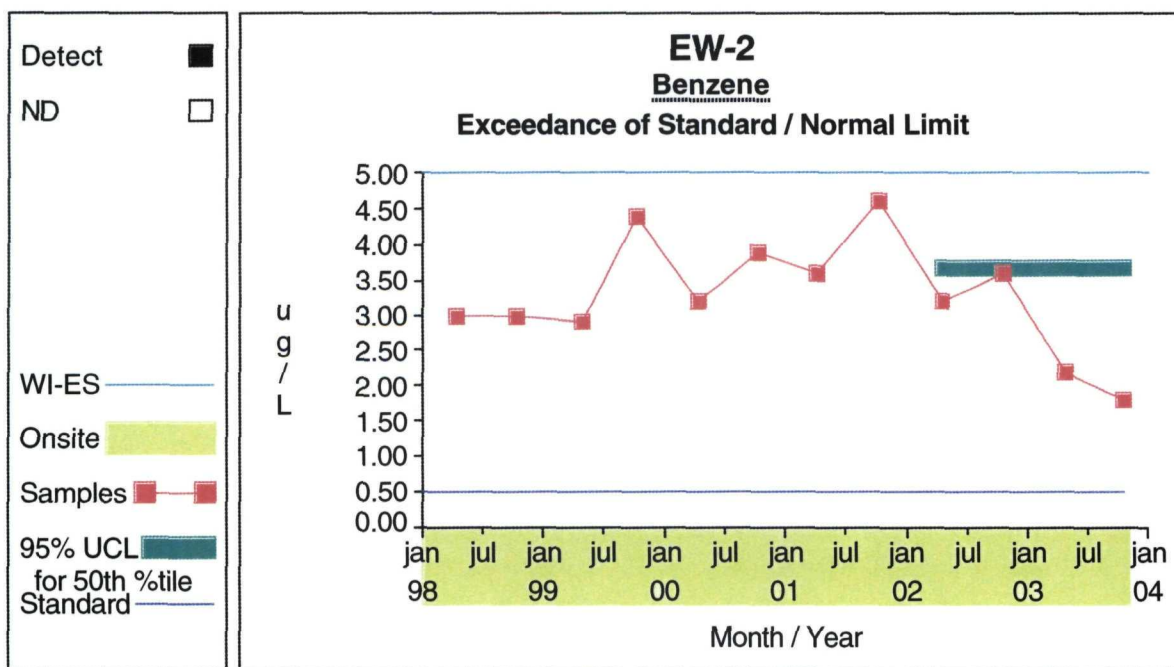
Comparison to Standard**Graph 160****Graph 161**

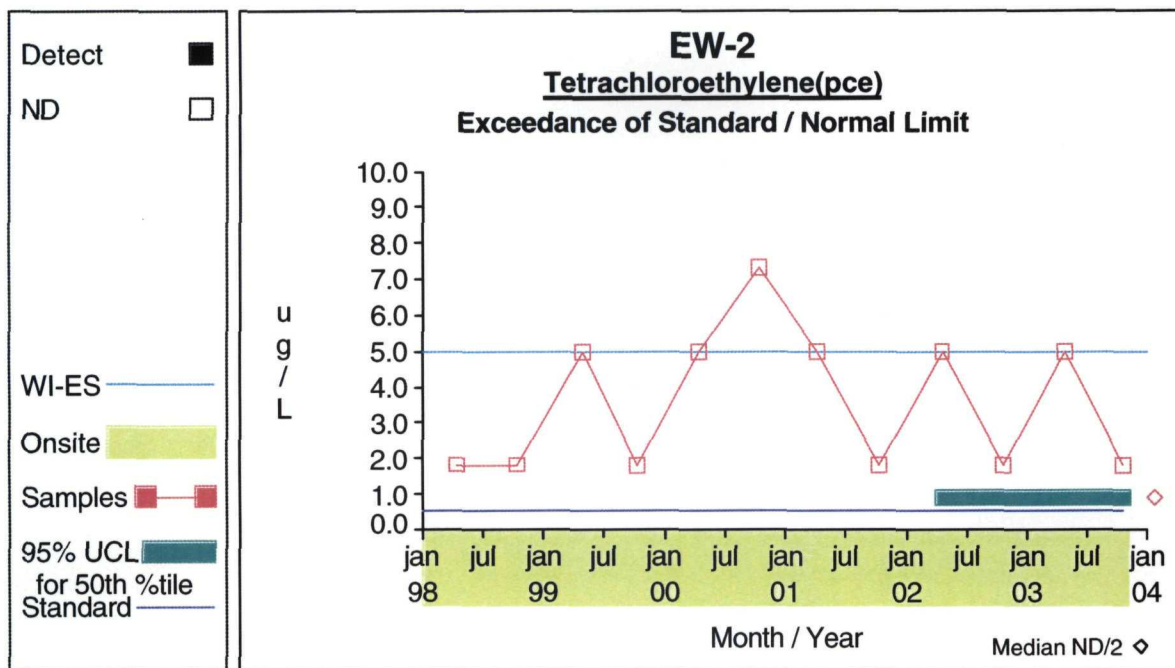
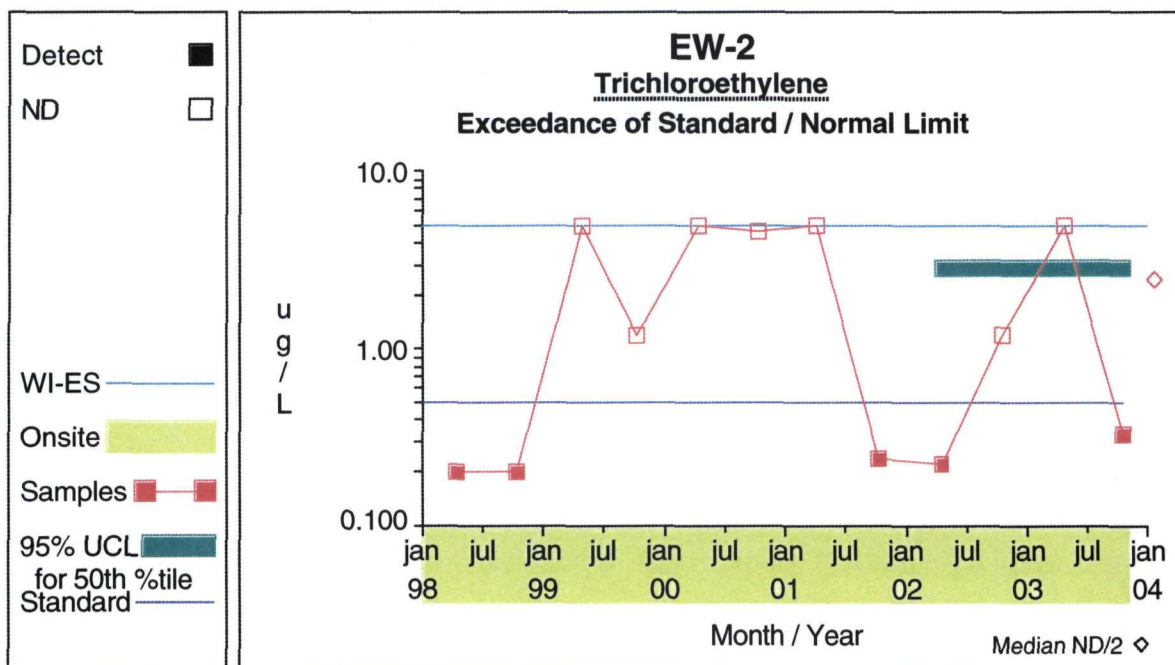
Comparison to Standard**Graph 162****Graph 163**

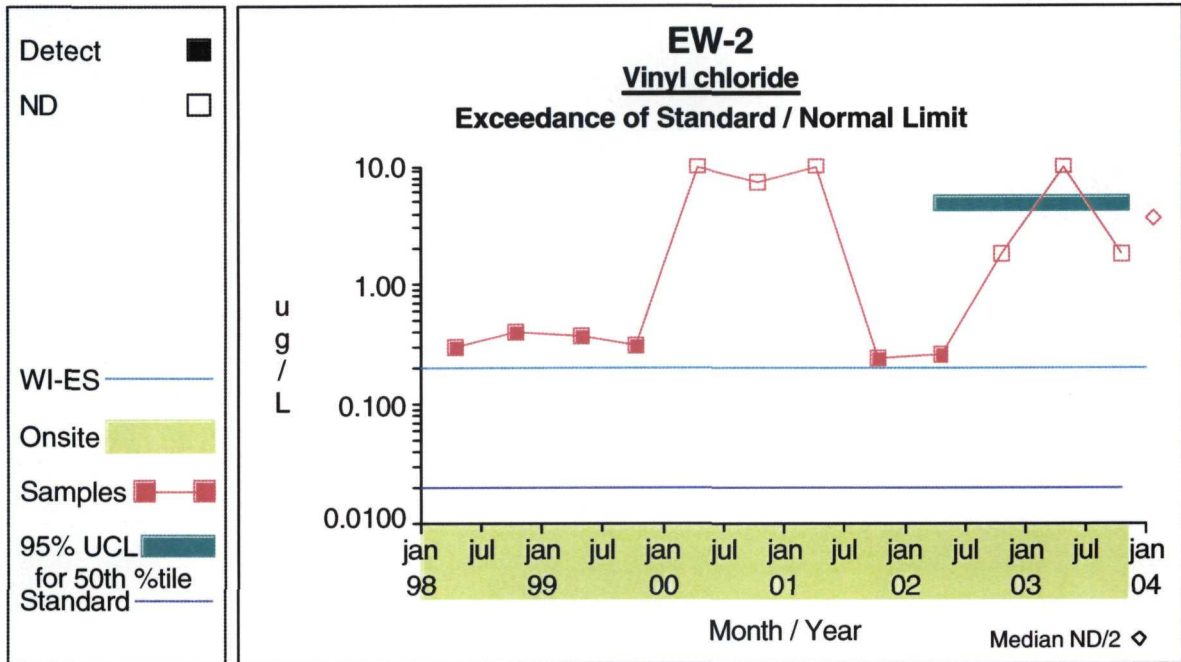
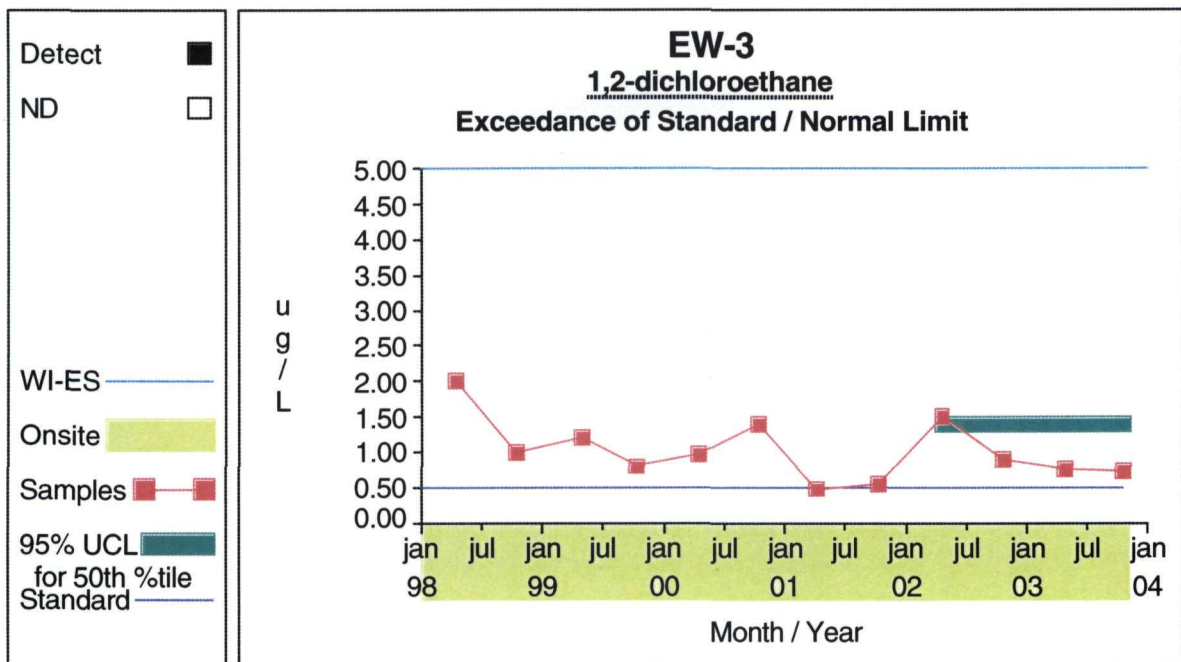
Comparison to Standard**Graph 170****Graph 171**

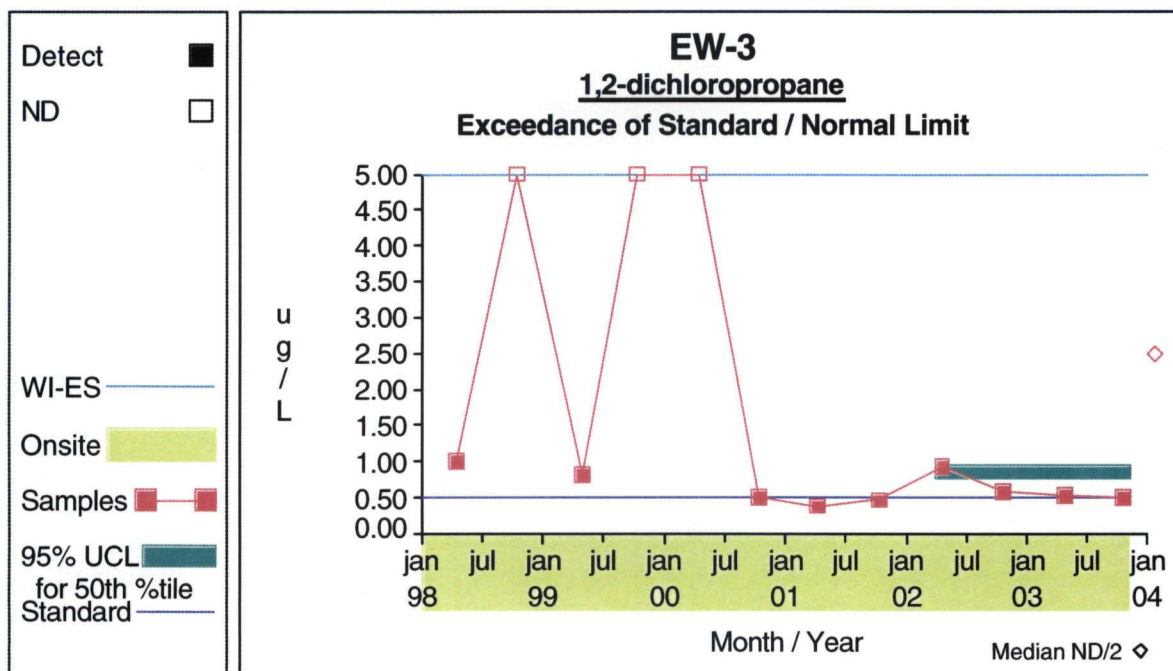
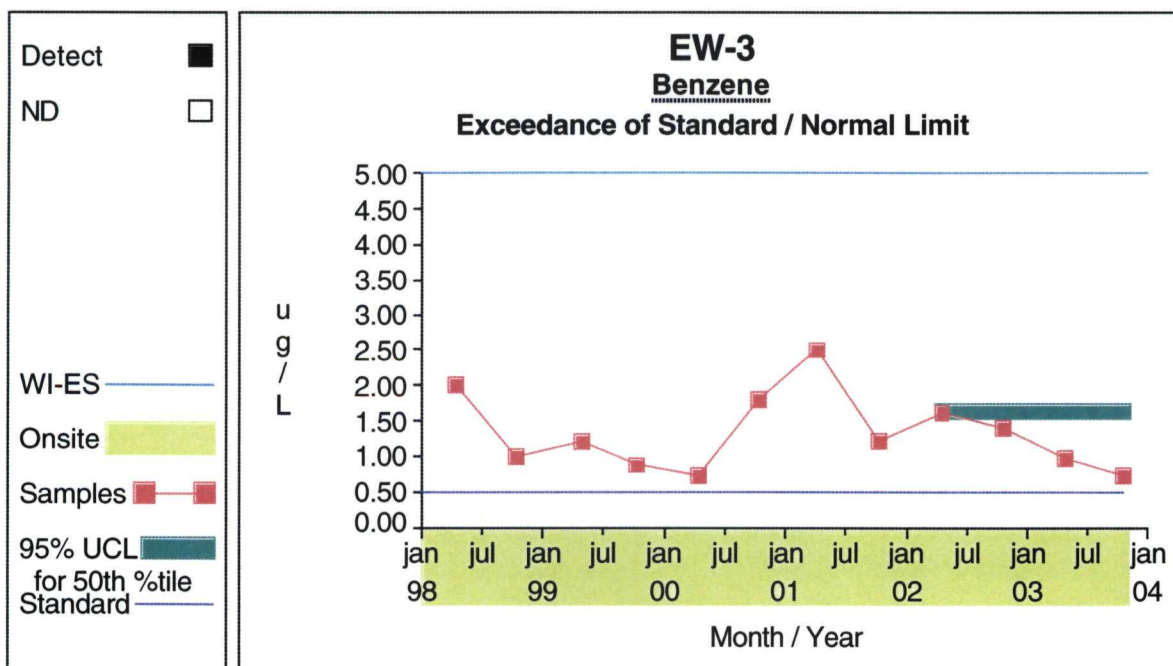
Comparison to Standard**Graph 178****Graph 179**

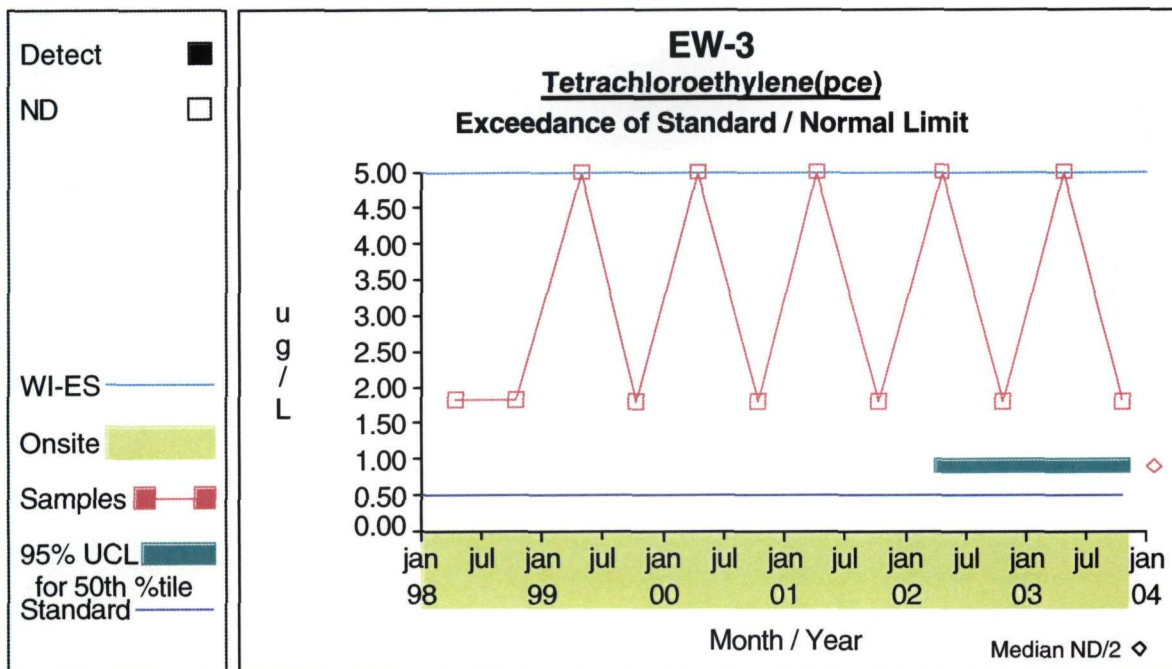
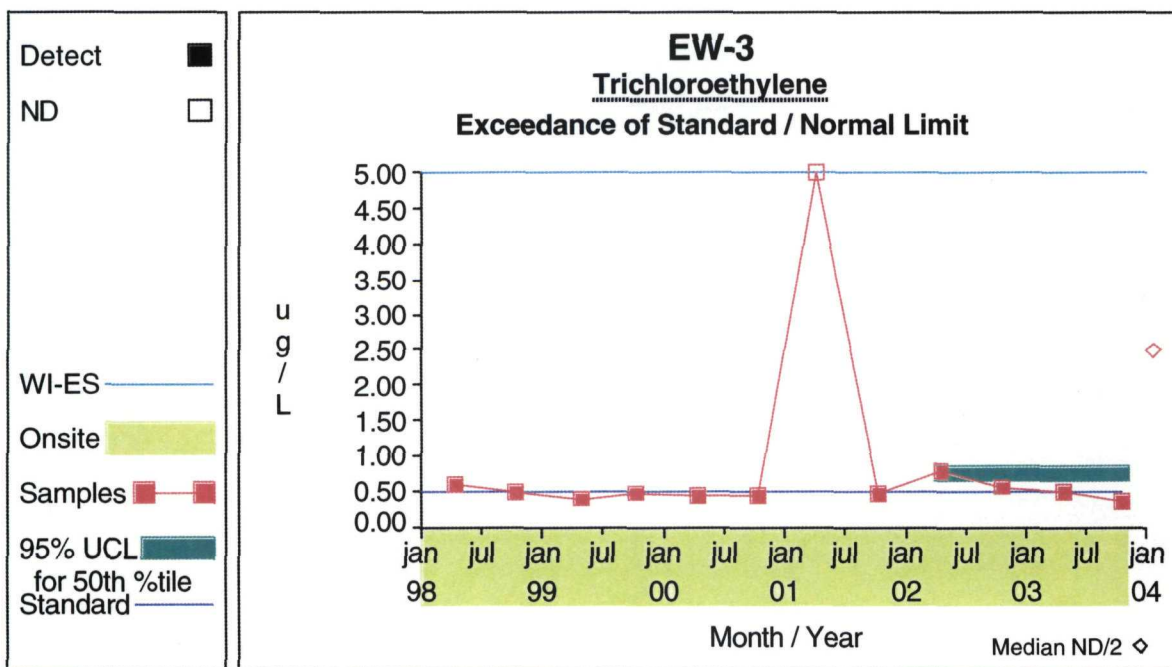
Comparison to Standard**Graph 180****Graph 181**

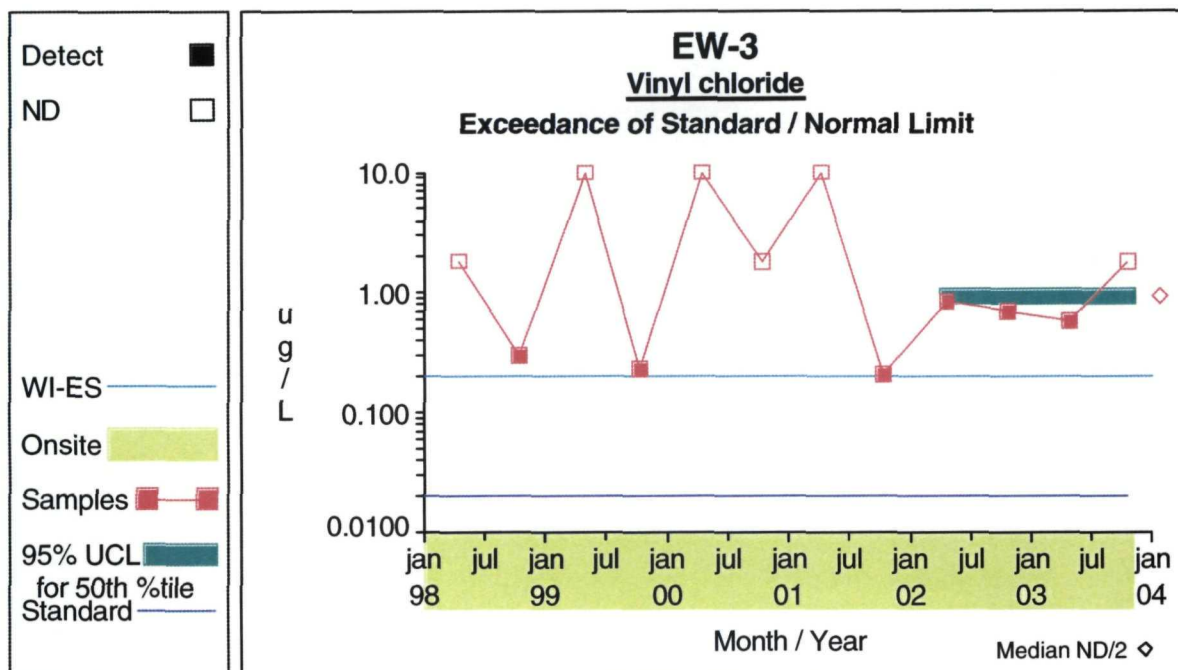
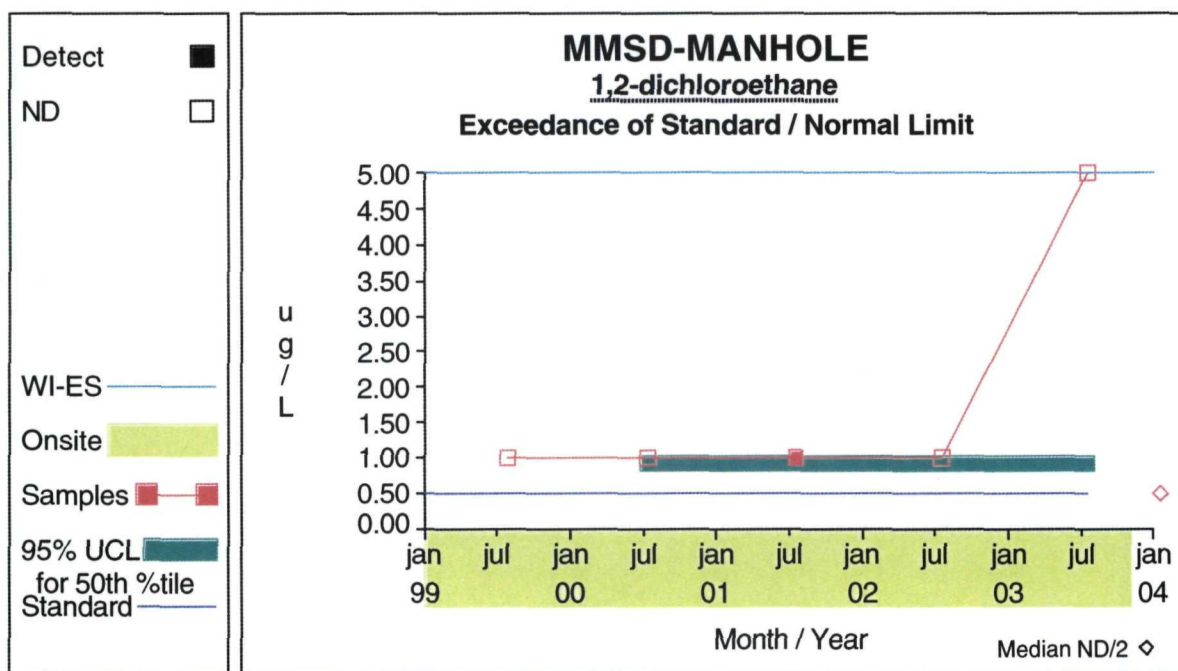
Comparison to Standard**Graph 182****Graph 183**

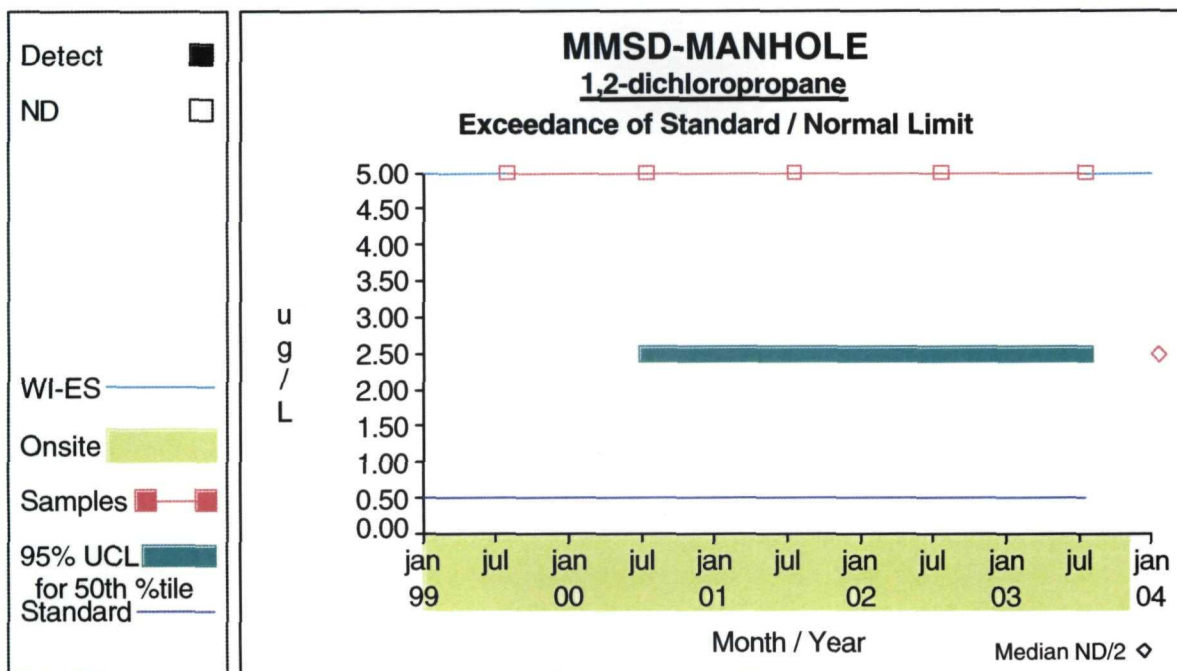
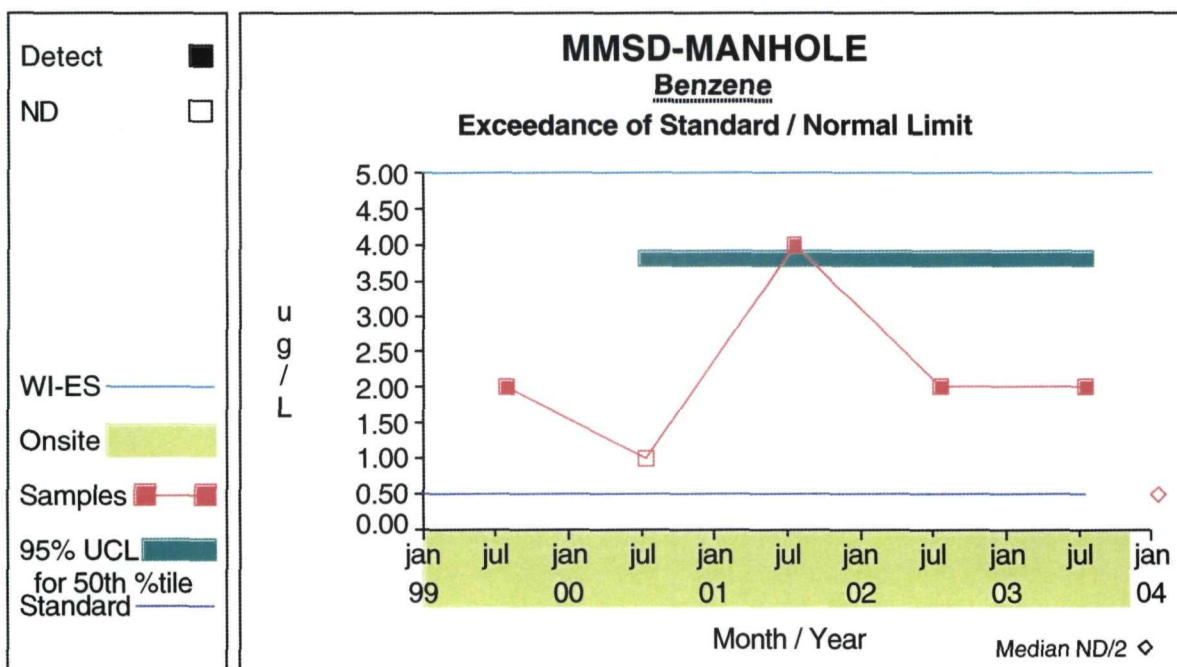
Comparison to Standard**Graph 188****Graph 189**

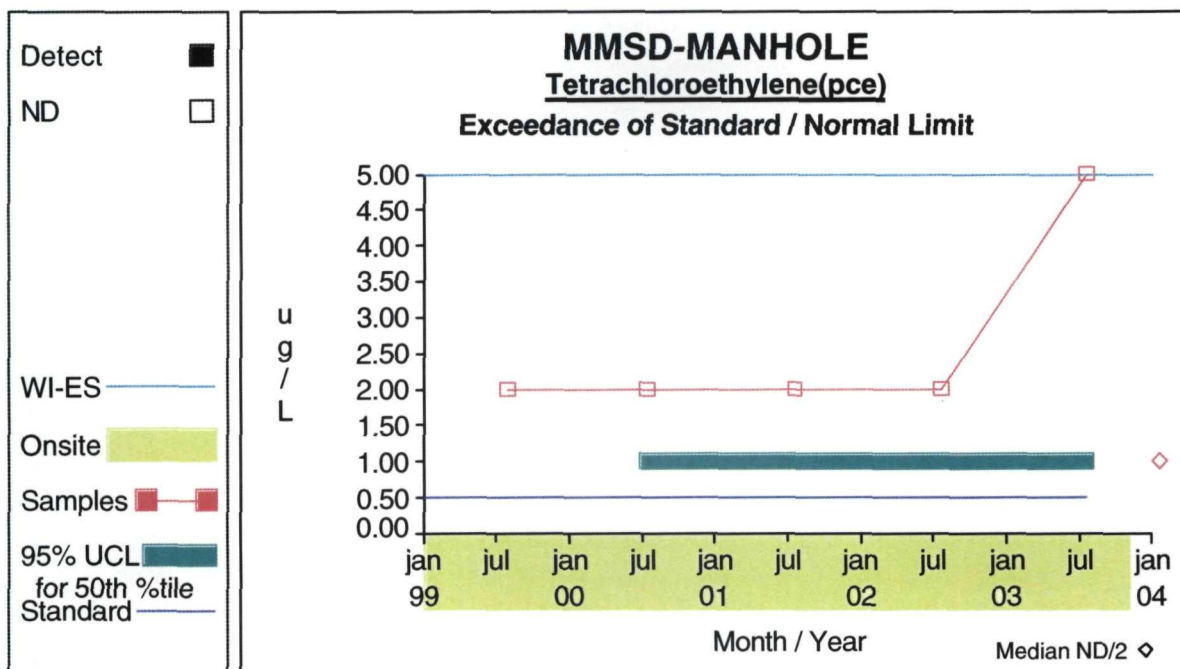
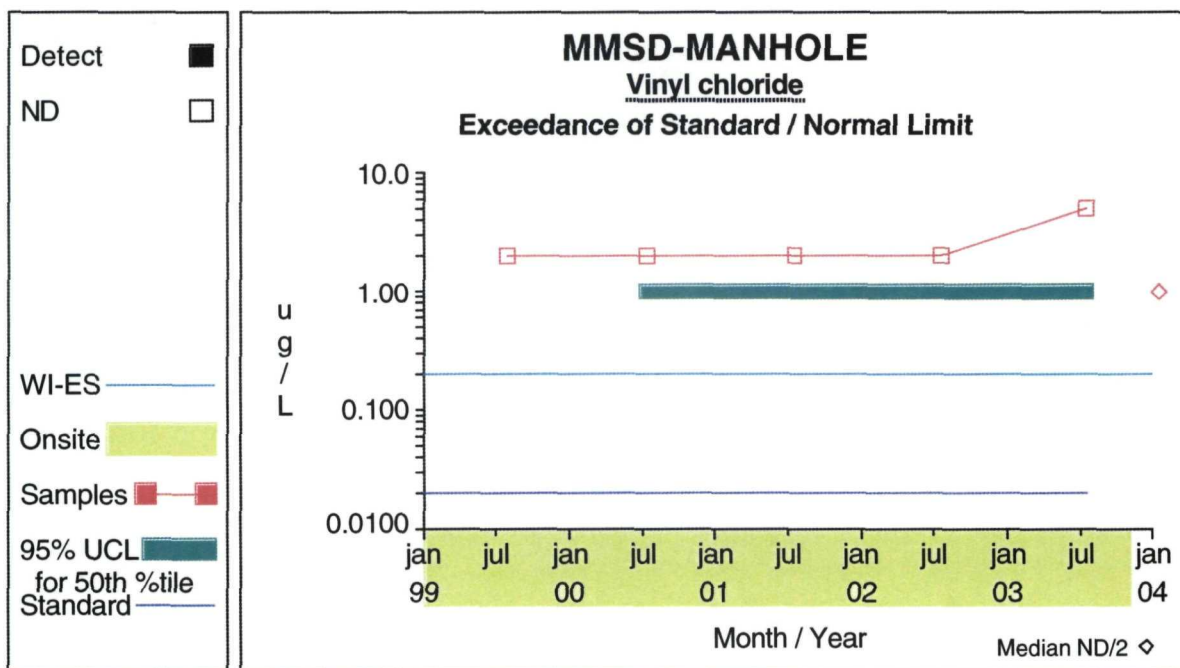
Comparison to Standard**Graph 190****Graph 191**

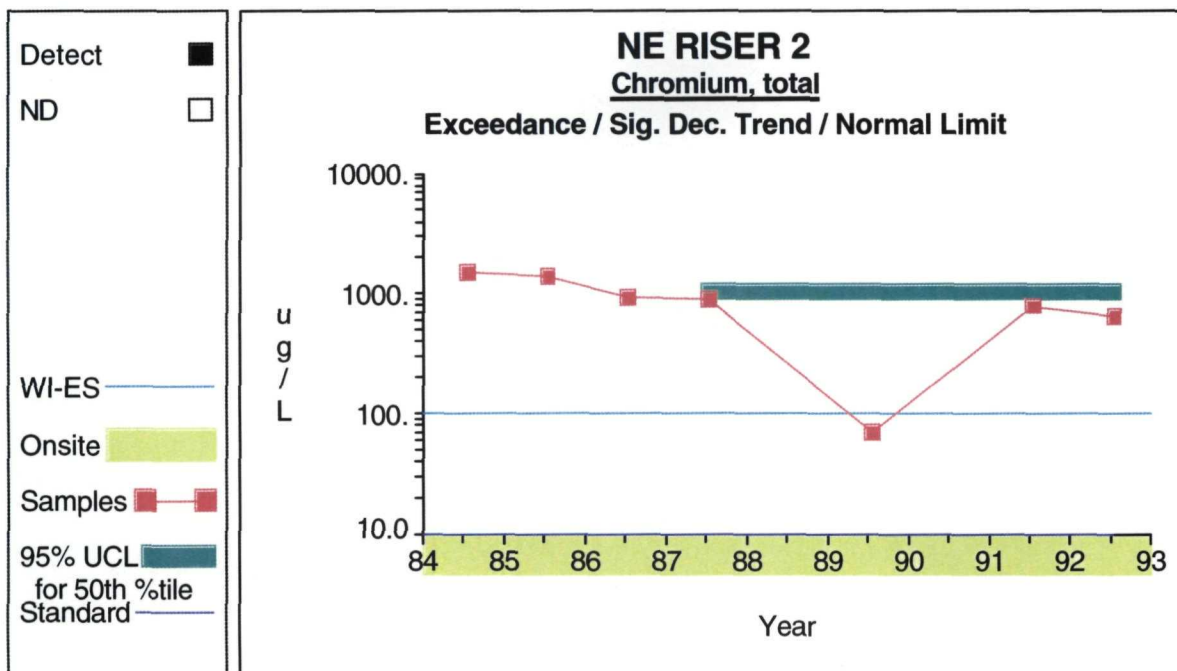
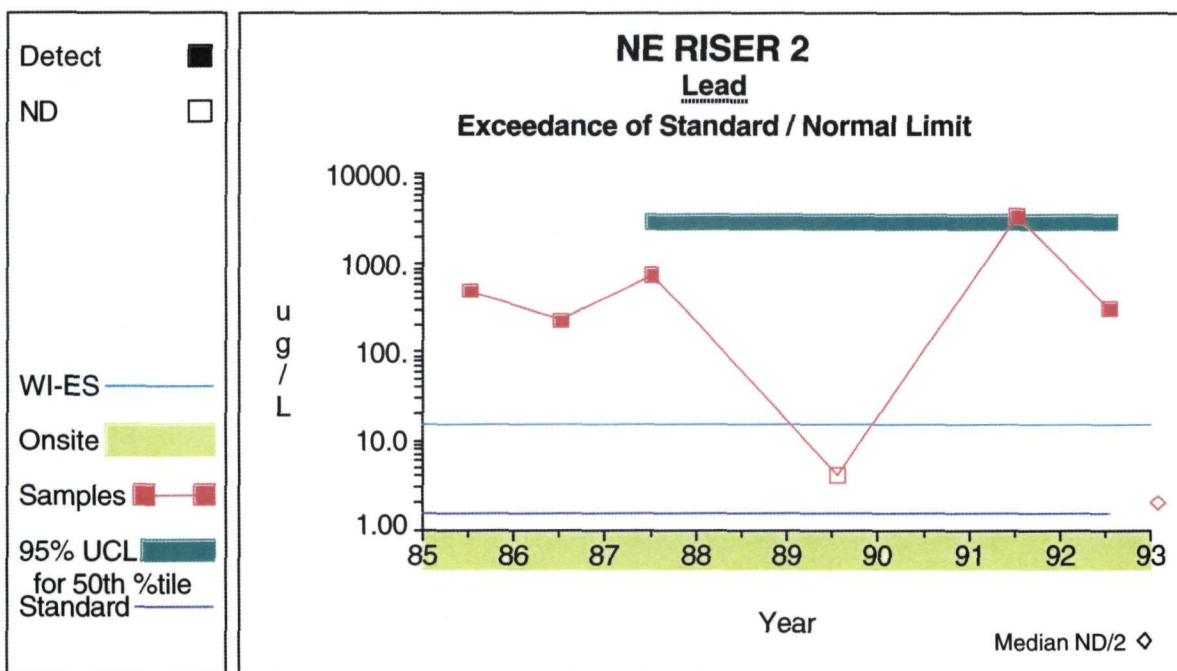
Comparison to Standard**Graph 192****Graph 193**

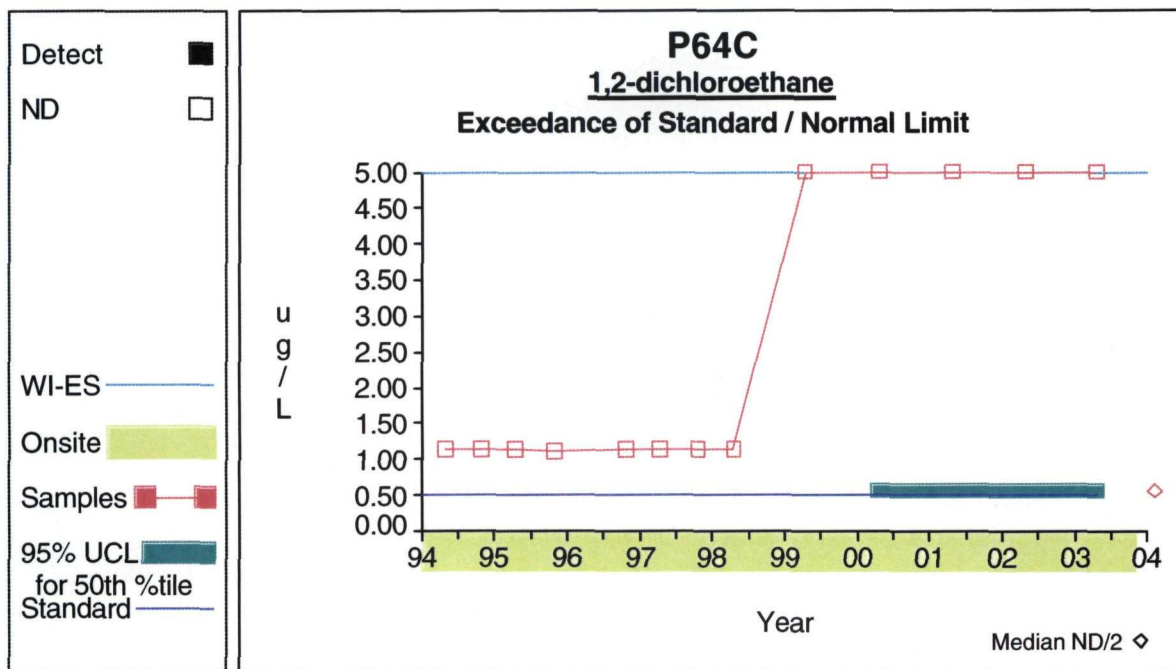
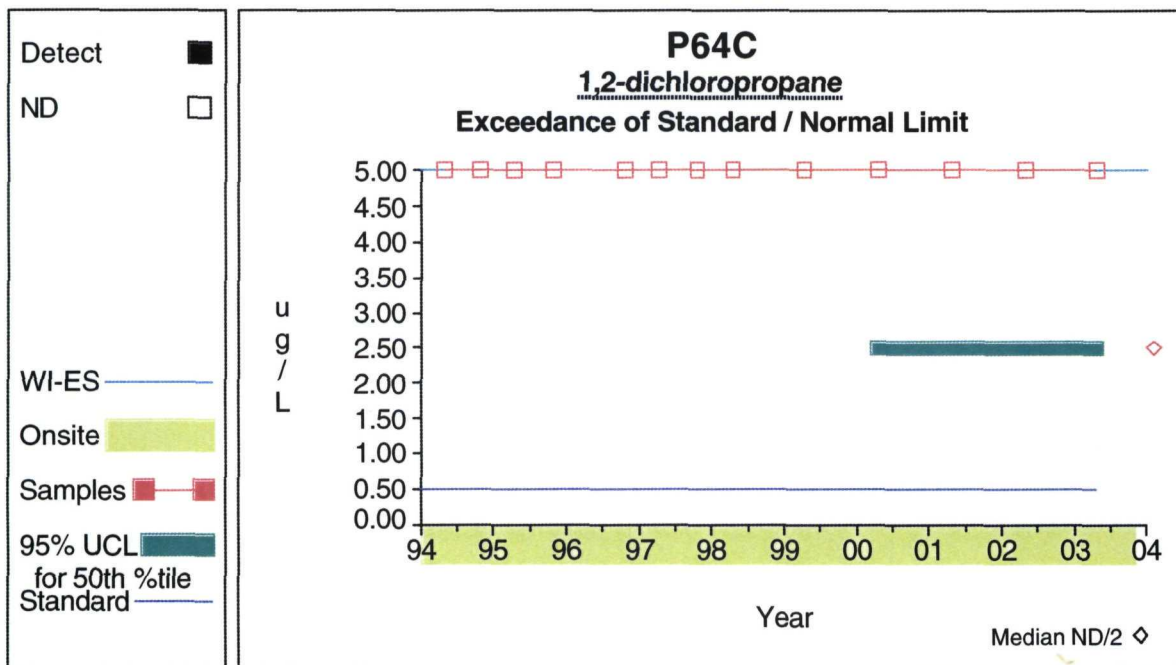
Comparison to Standard**Graph 198****Graph 199**

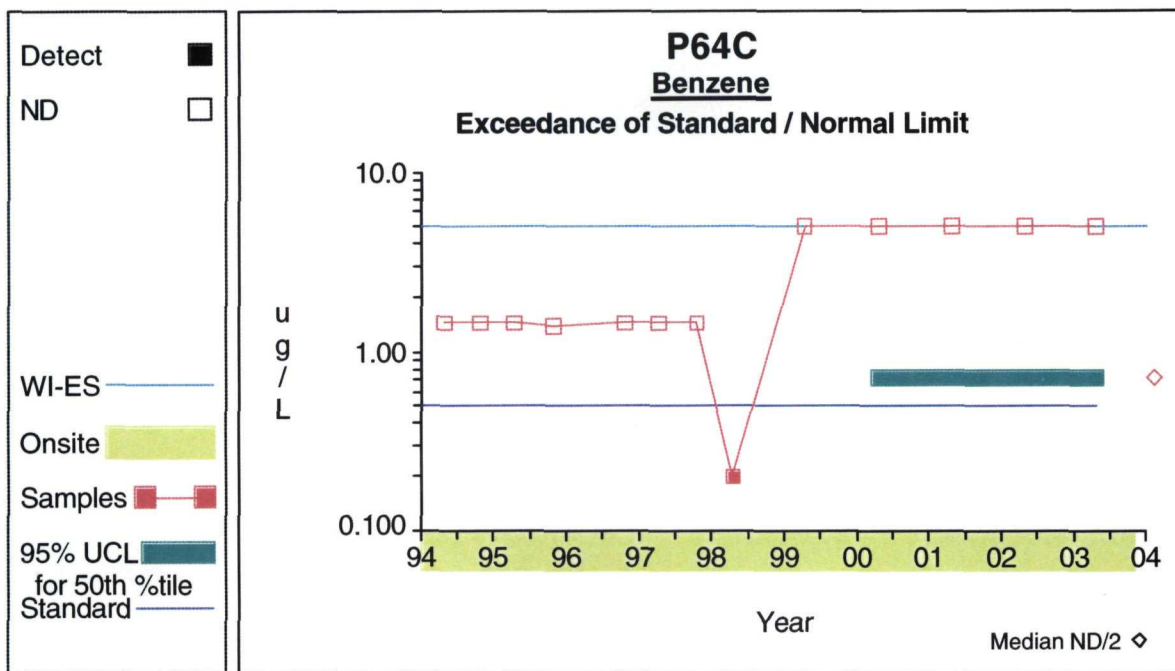
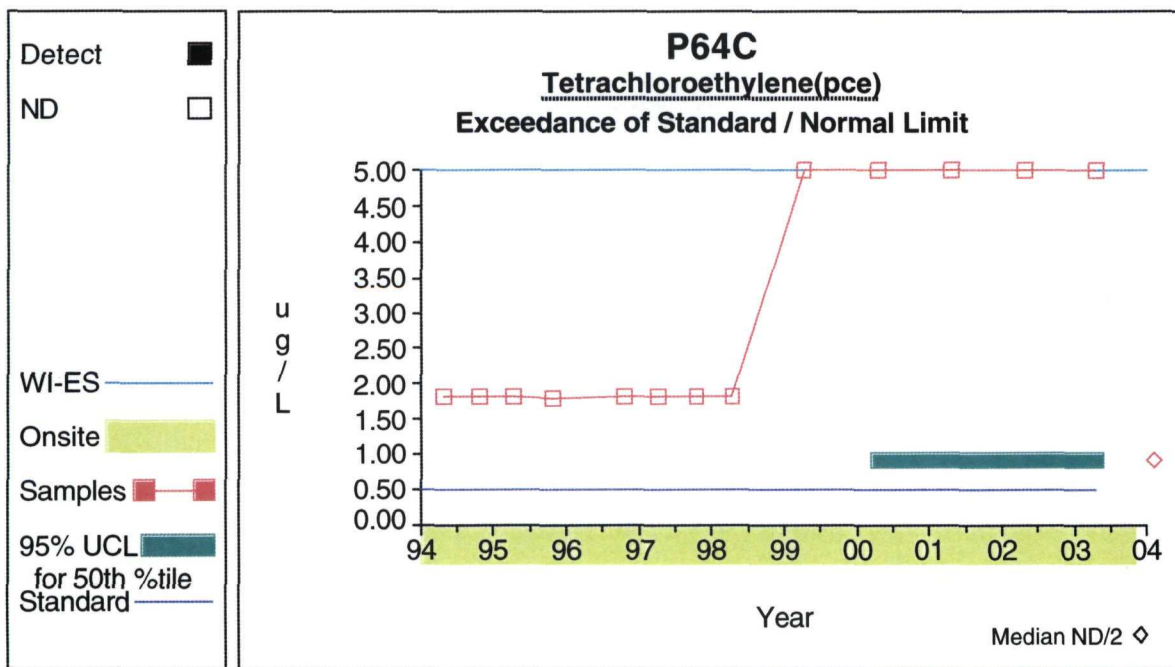
Comparison to Standard**Graph 200****Graph 201**

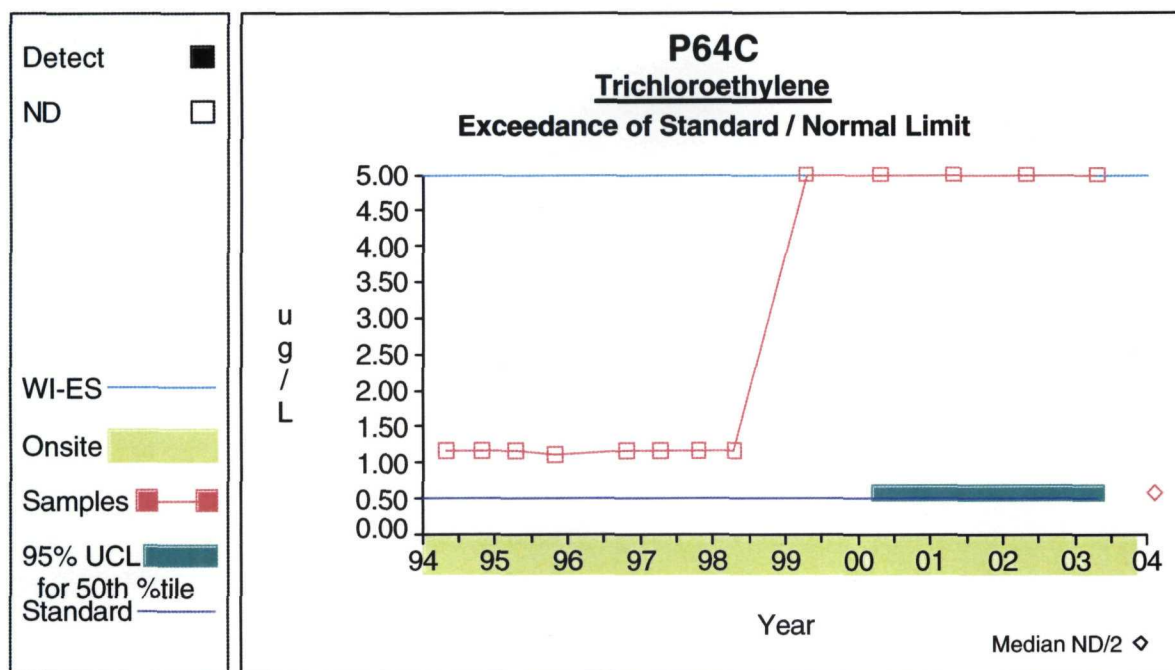
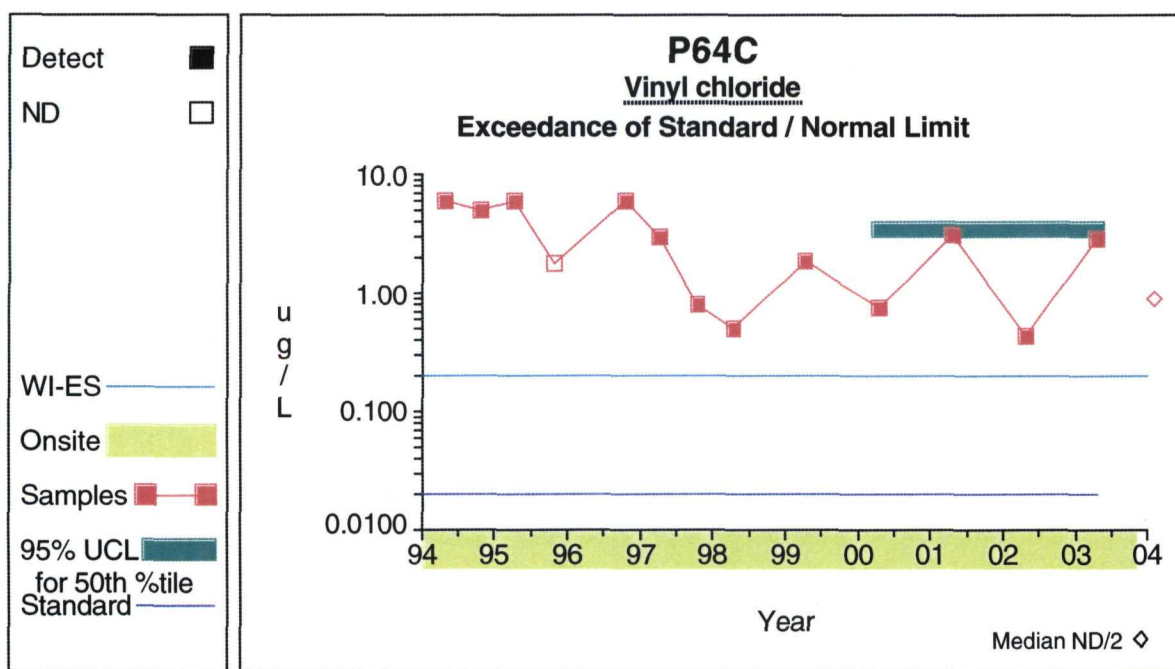
Comparison to Standard**Graph 202****Graph 203**

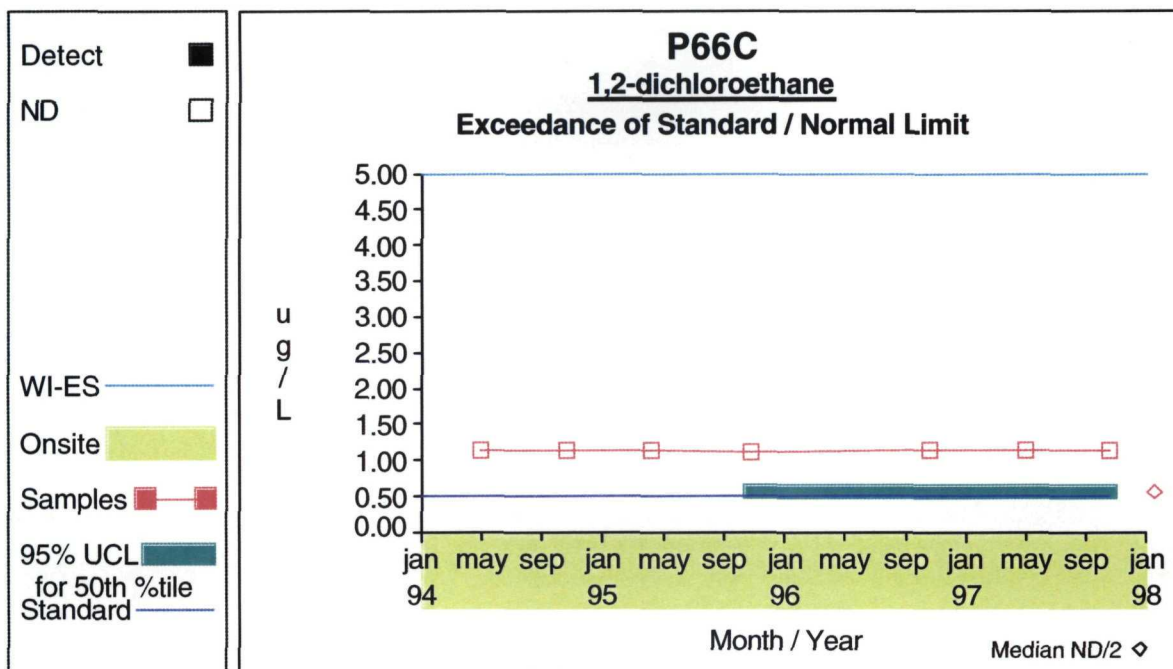
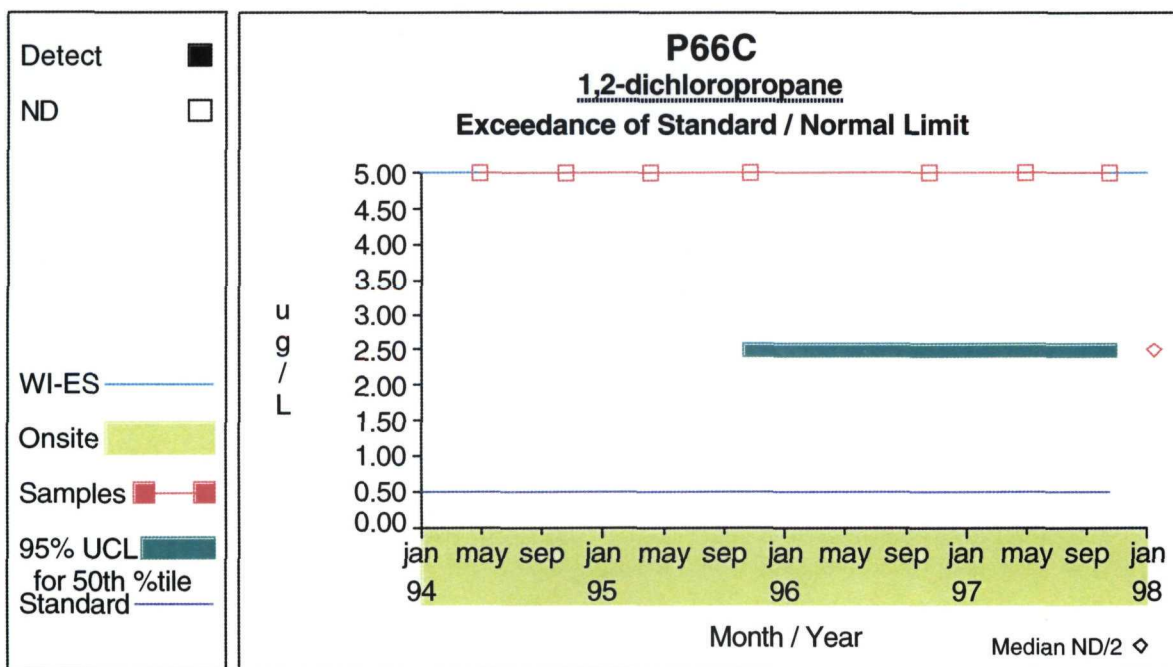
Comparison to Standard**Graph 208****Graph 210**

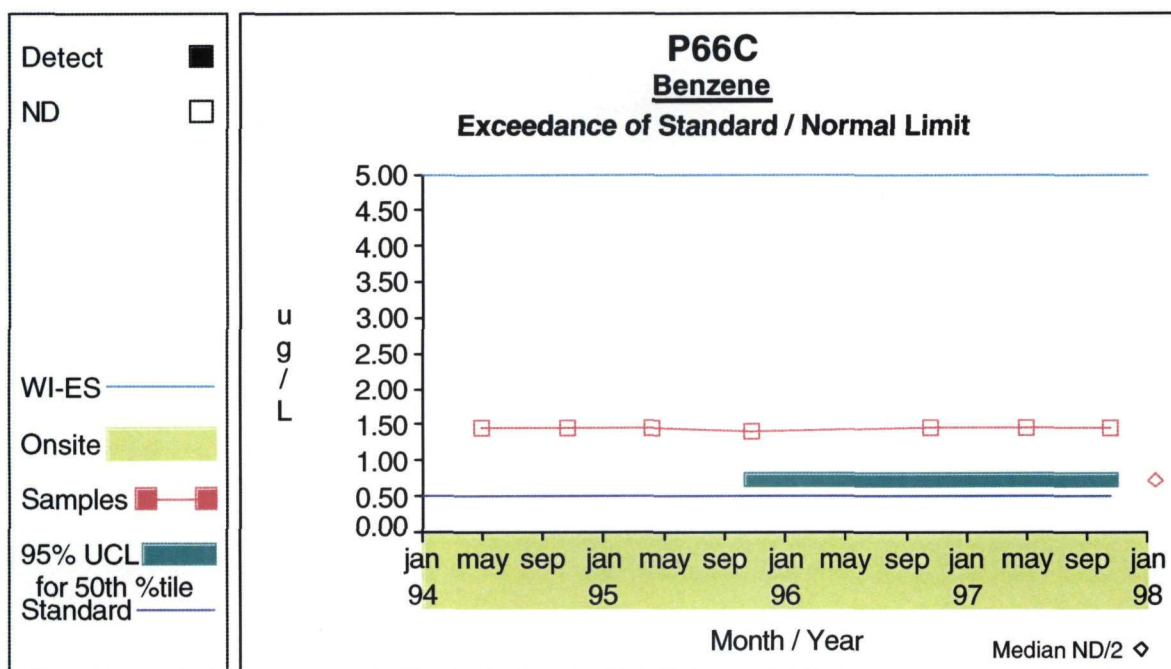
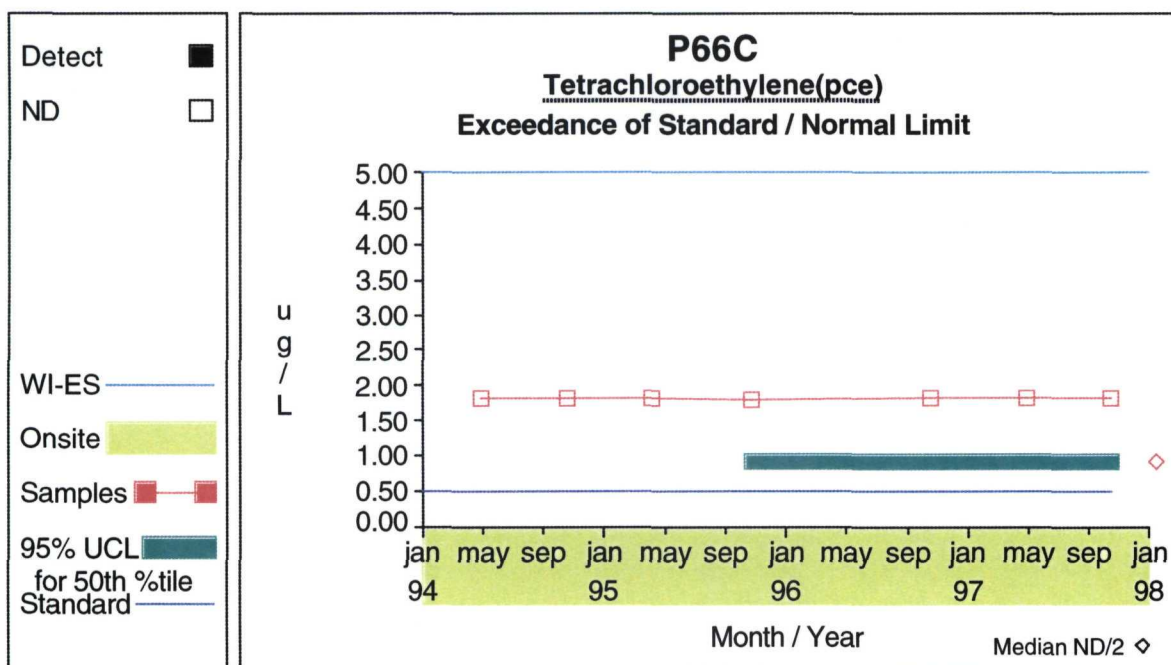
Comparison to Standard**Graph 214****Graph 216**

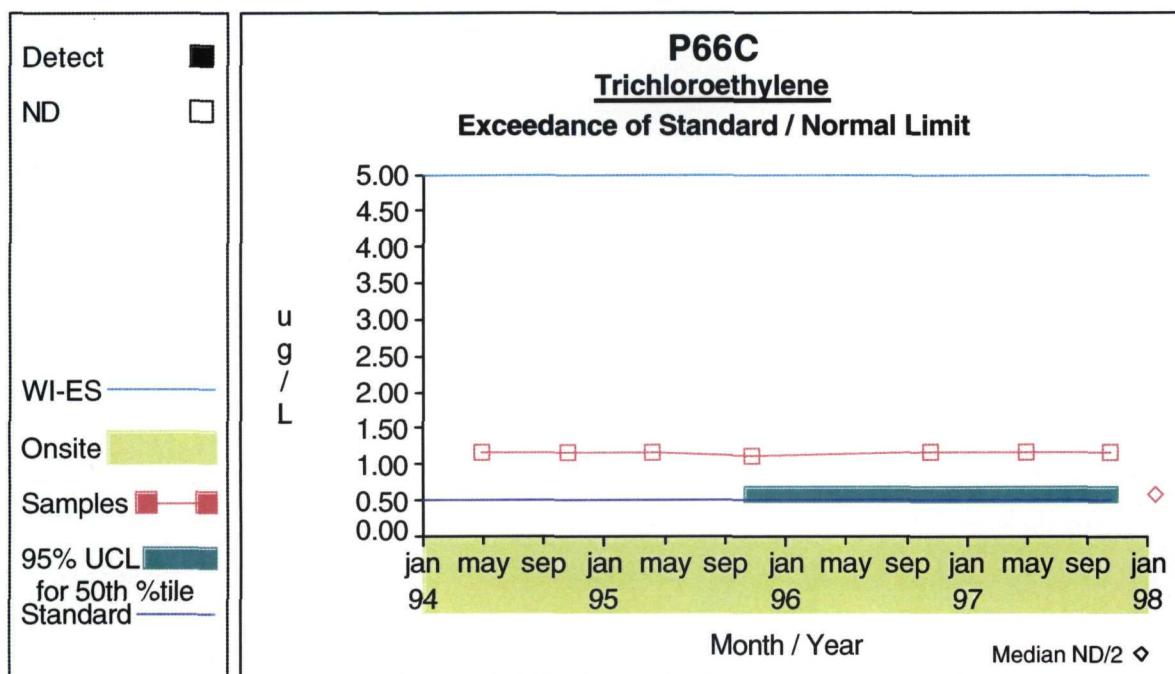
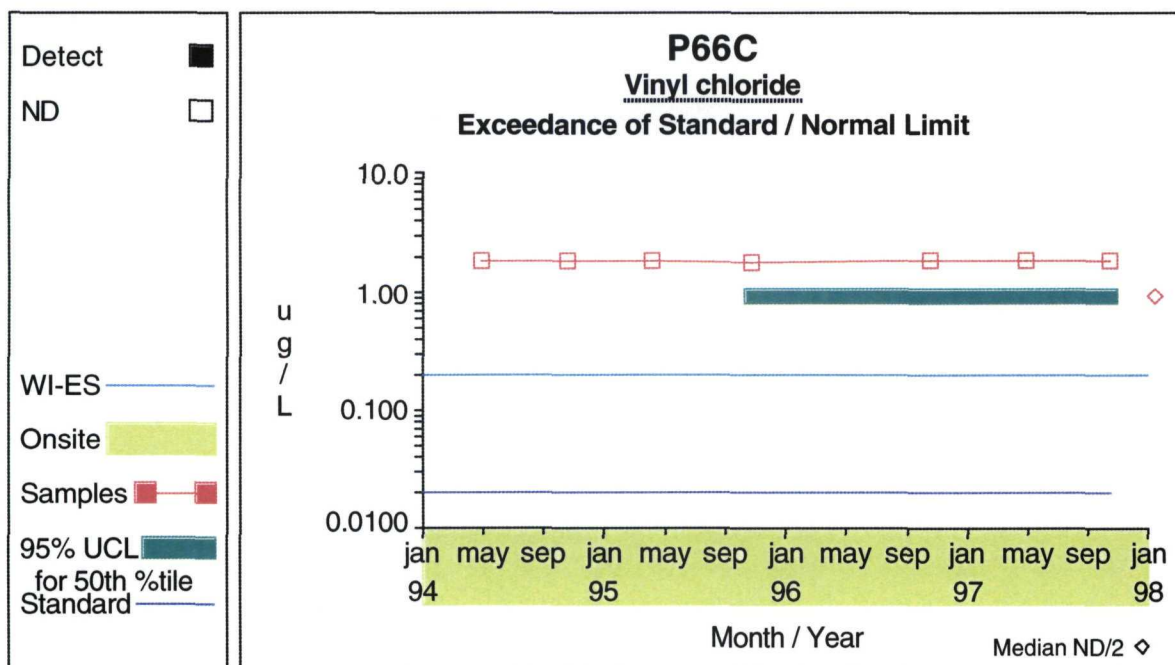
Comparison to Standard**Graph 221****Graph 222**

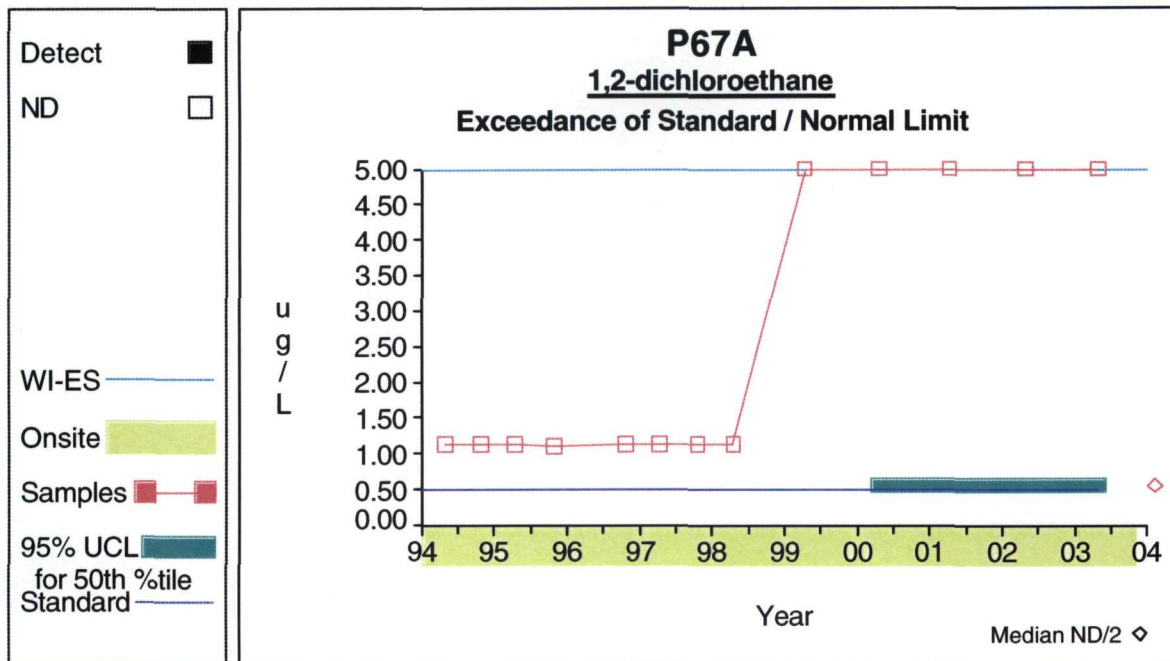
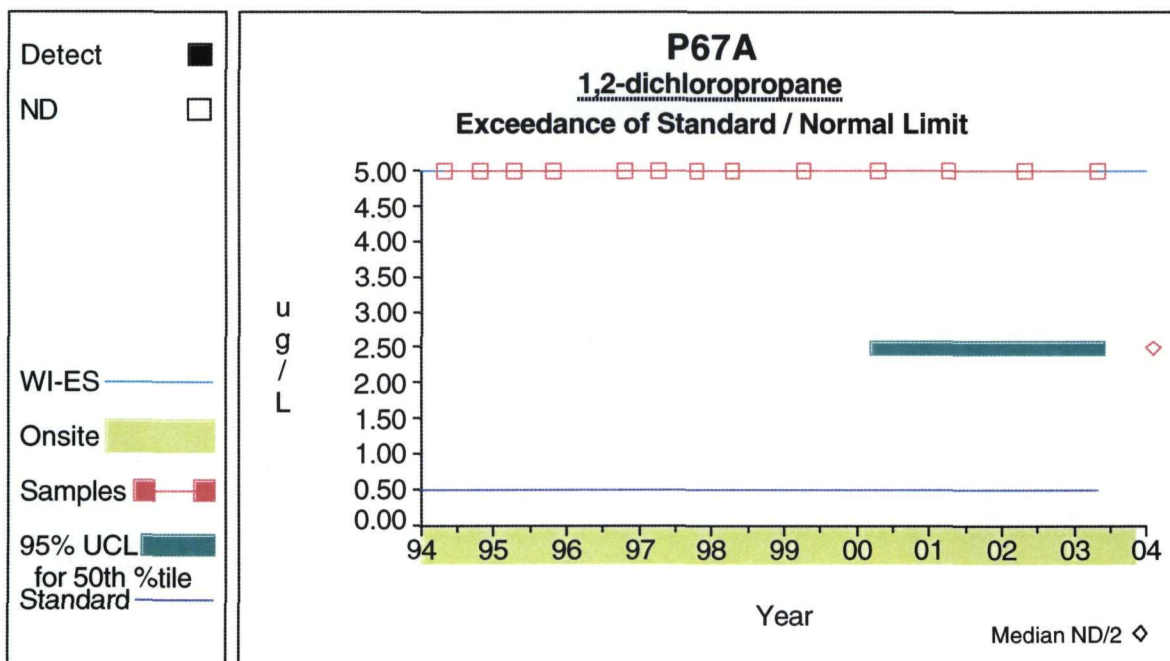
Comparison to Standard**Graph 223****Graph 228**

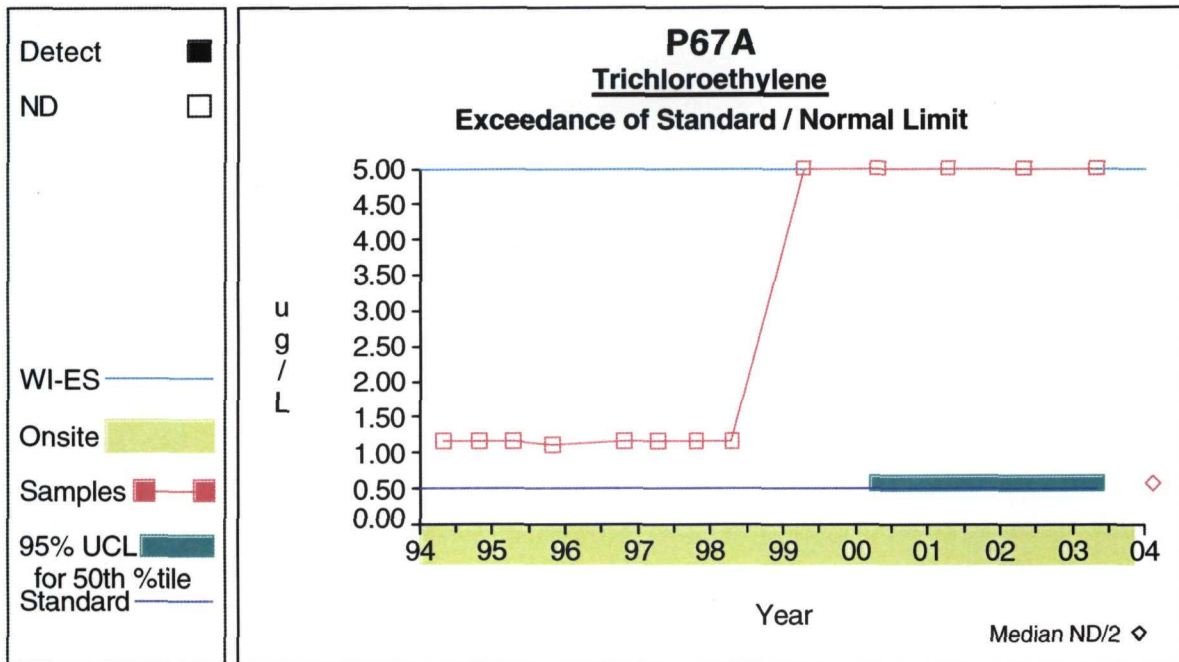
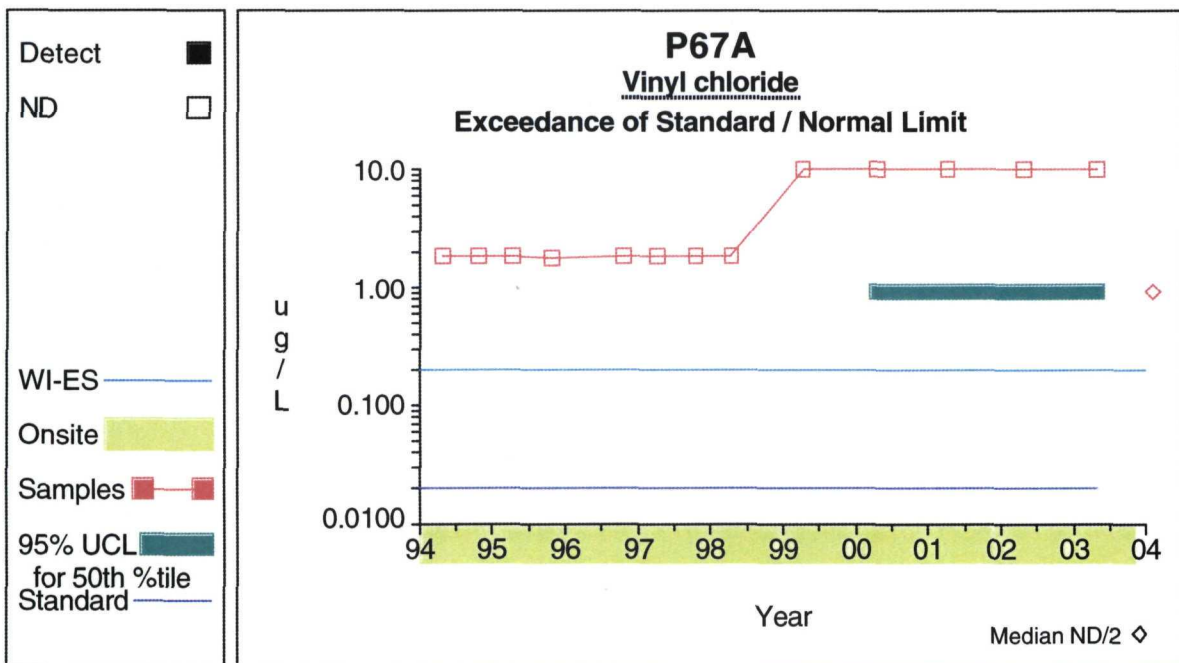
Comparison to Standard**Graph 229****Graph 230**

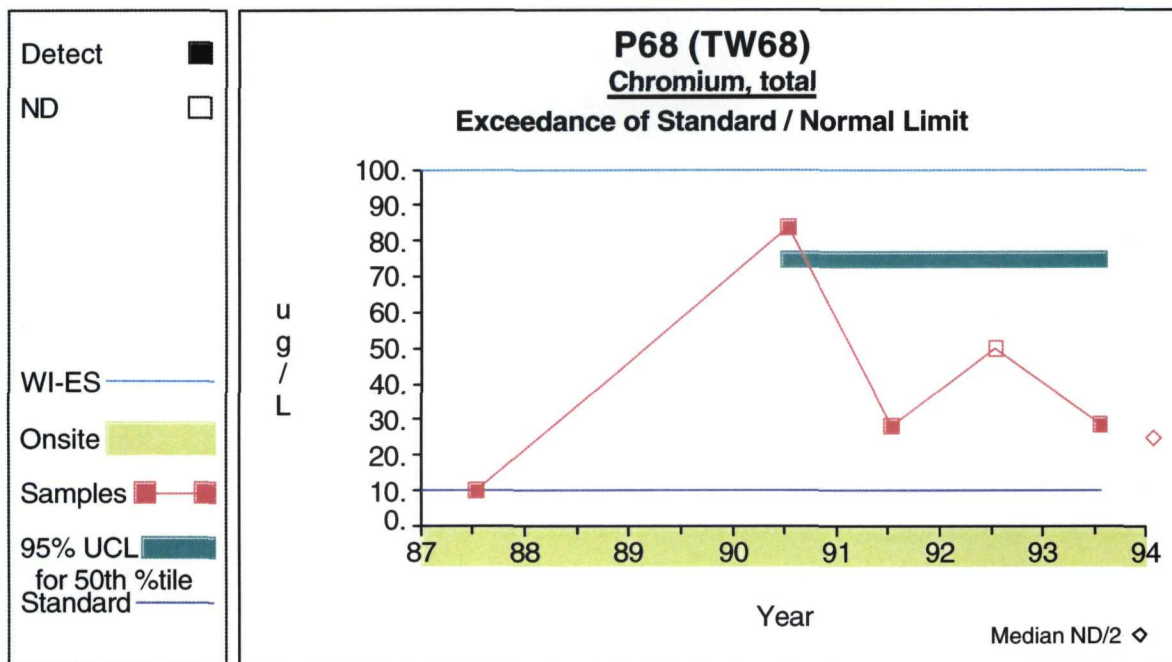
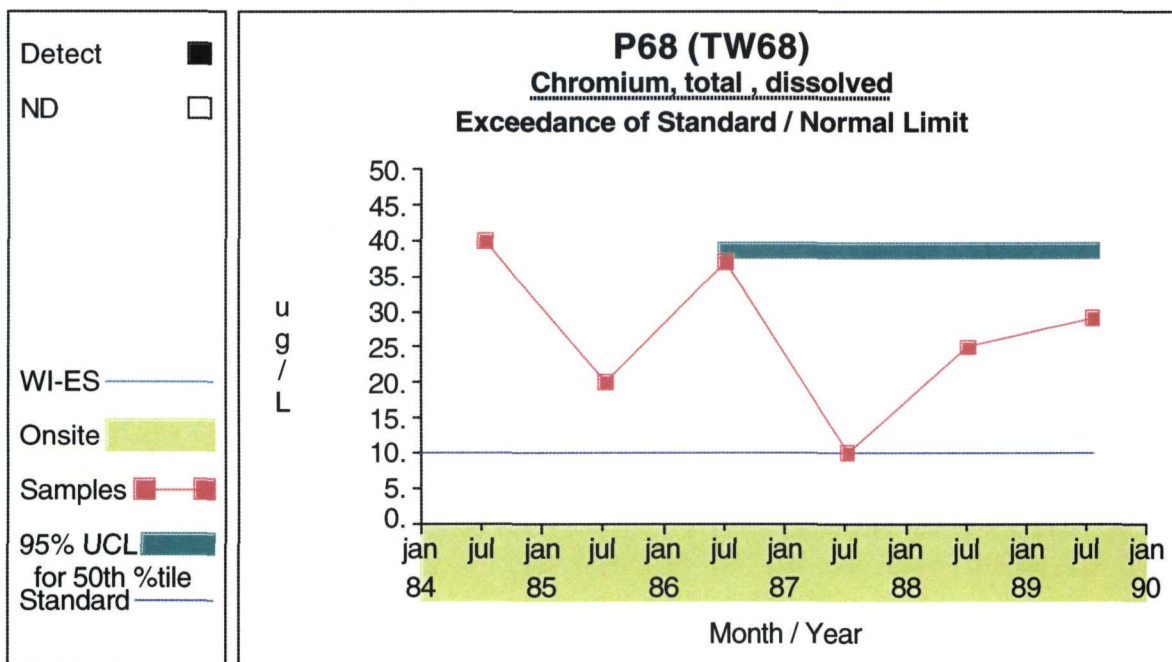
Comparison to Standard**Graph 231****Graph 232**

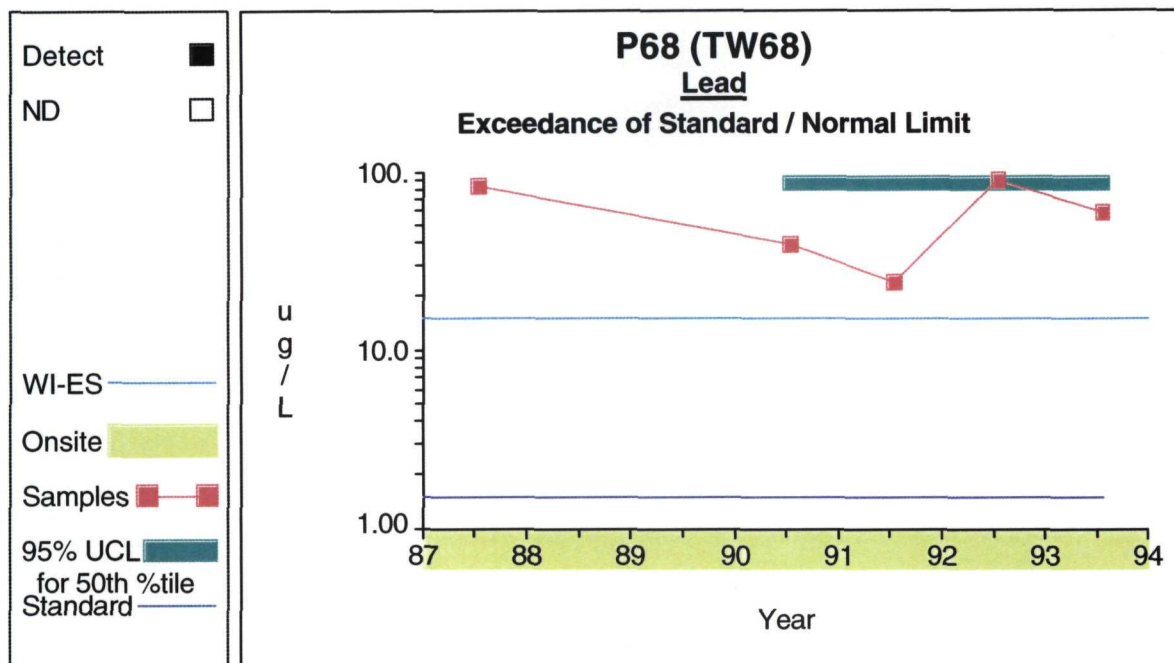
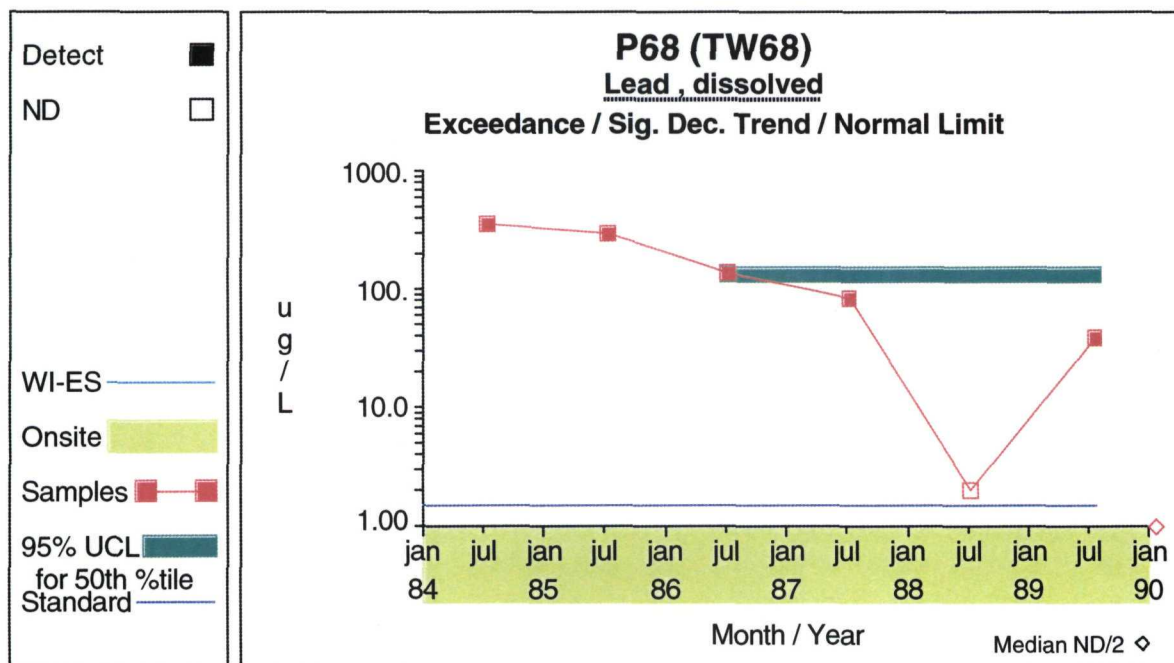
Comparison to Standard**Graph 233****Graph 238**

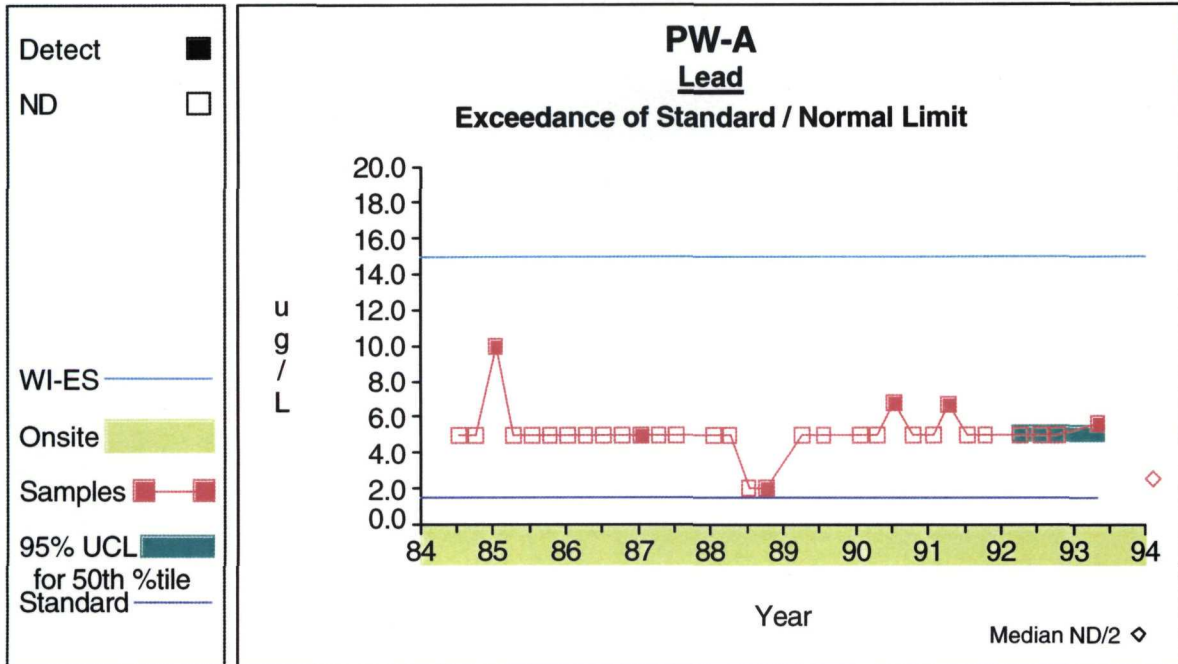
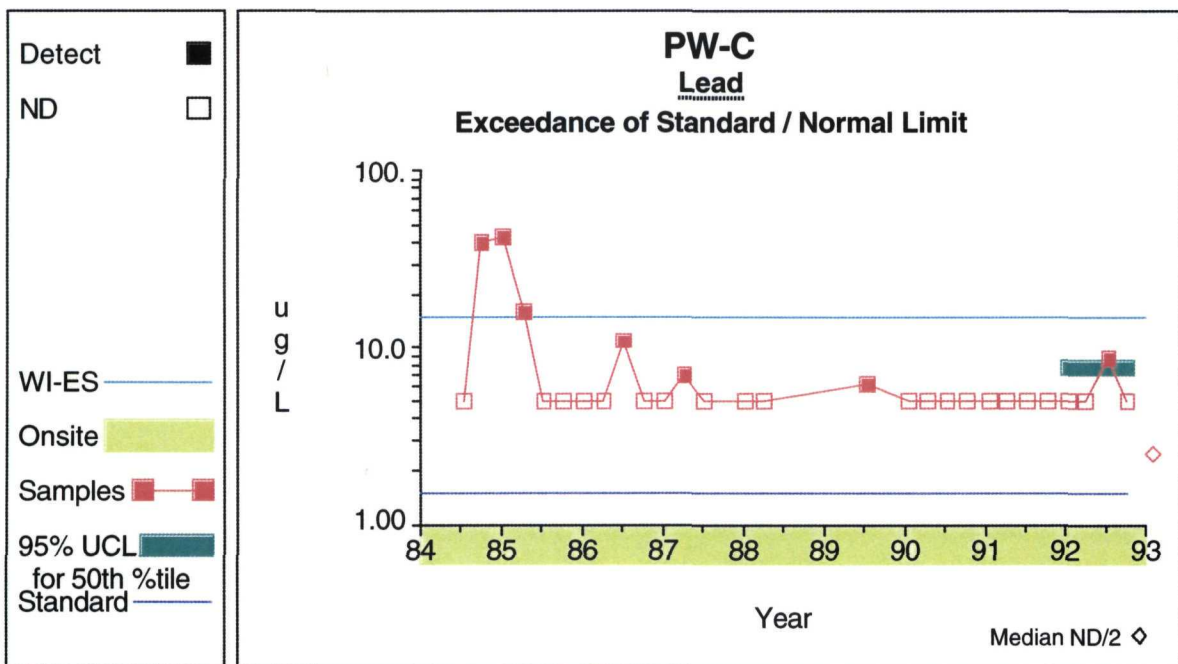
Comparison to Standard**Graph 239****Graph 240**

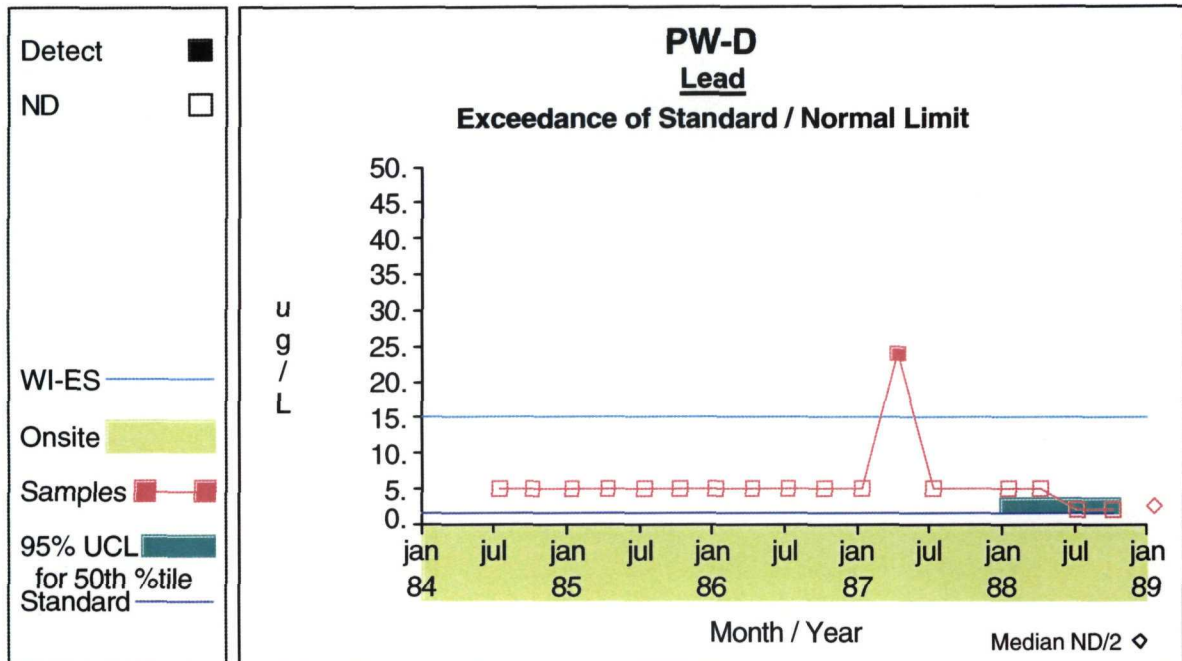
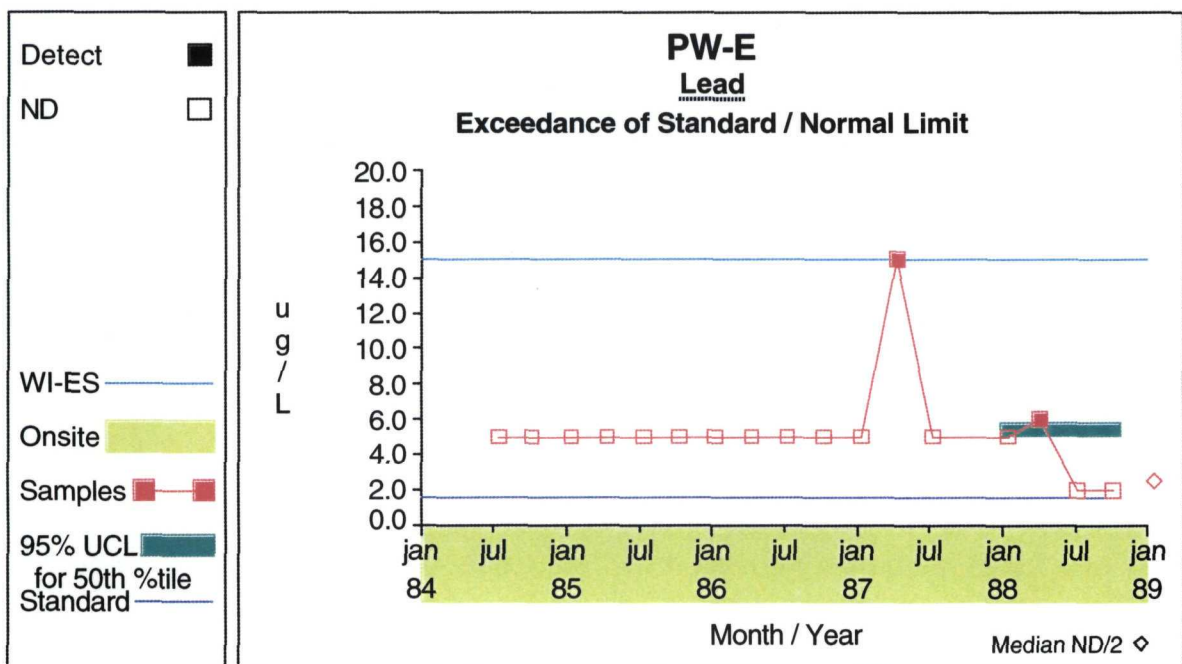
Comparison to Standard**Graph 241****Graph 242**

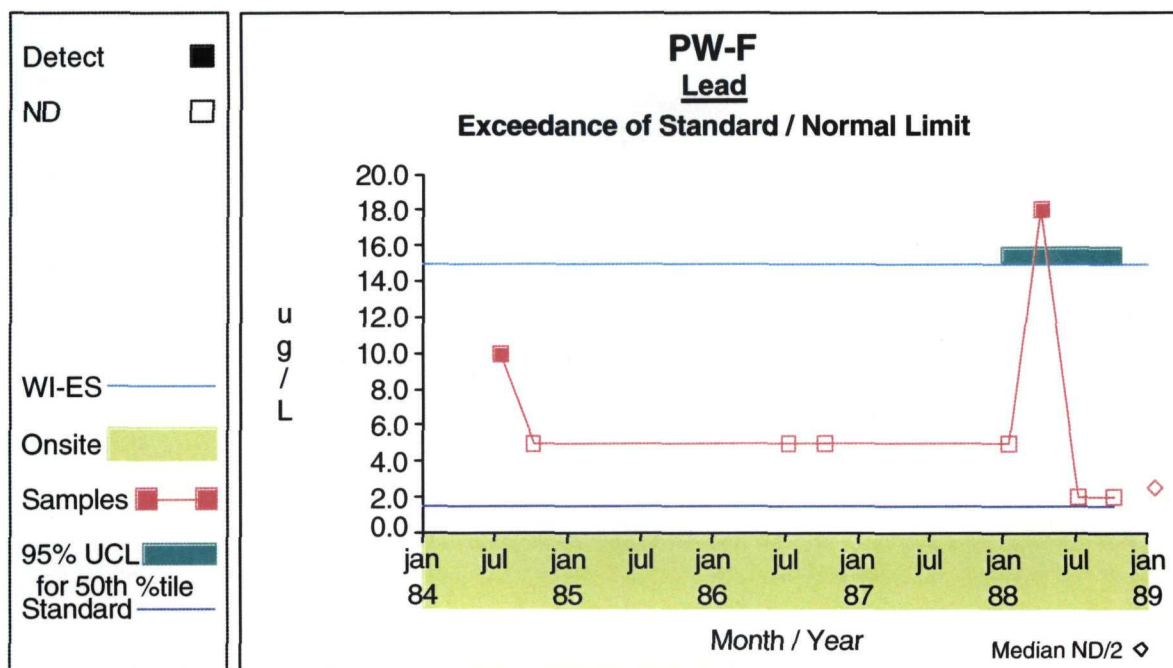
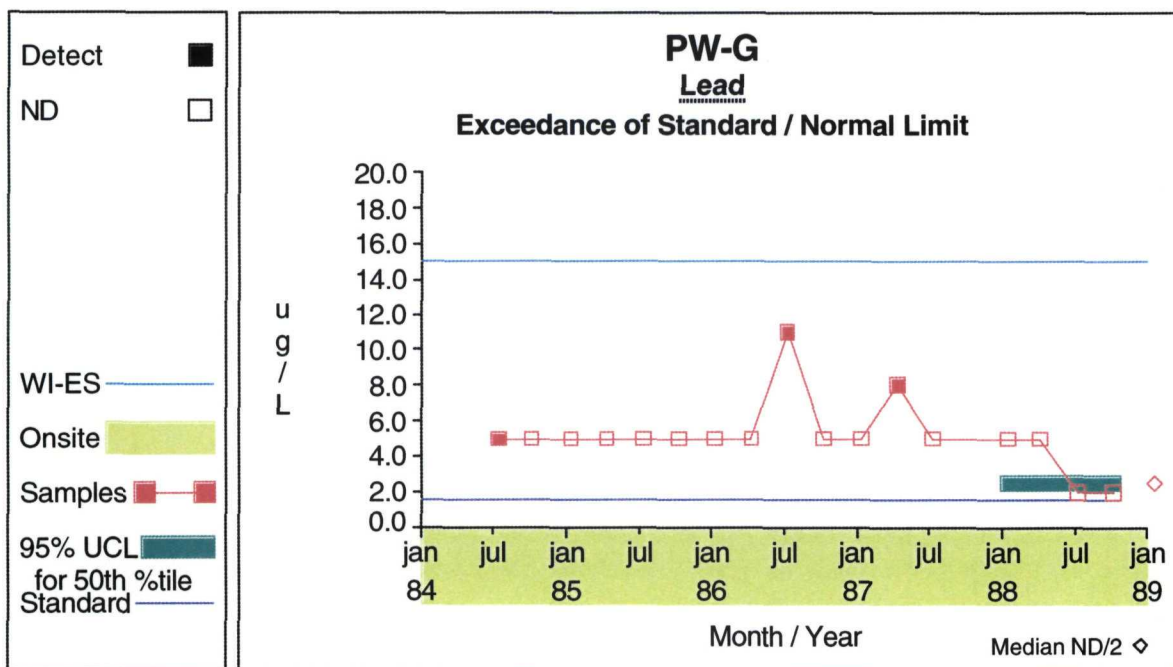
Comparison to Standard**Graph 249****Graph 250**

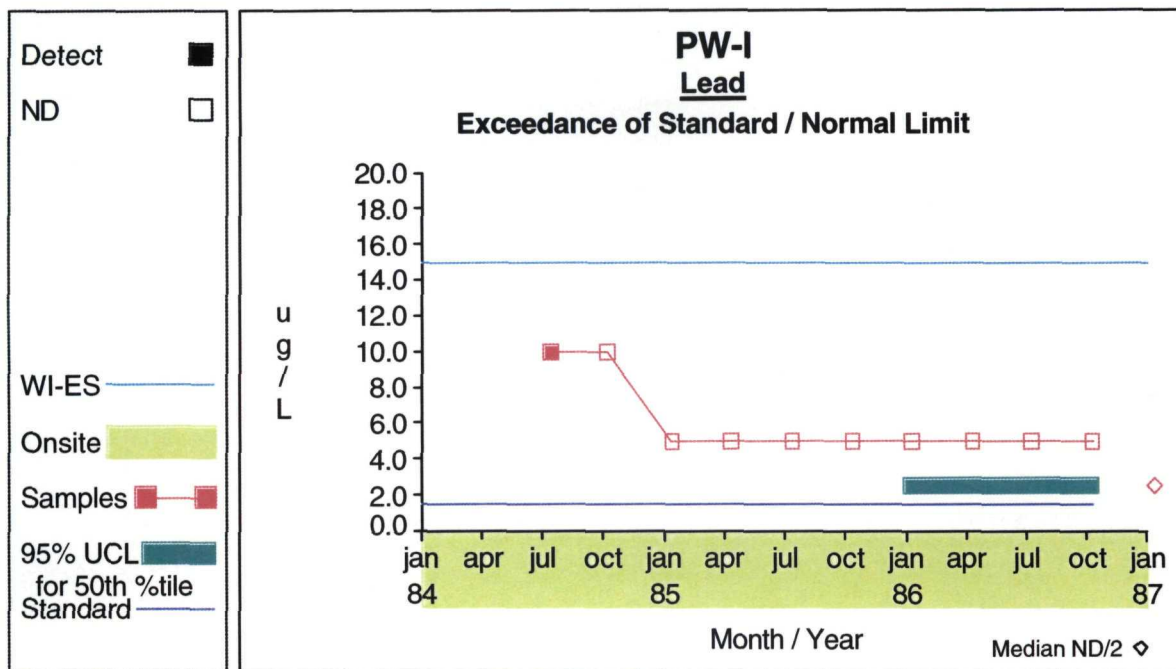
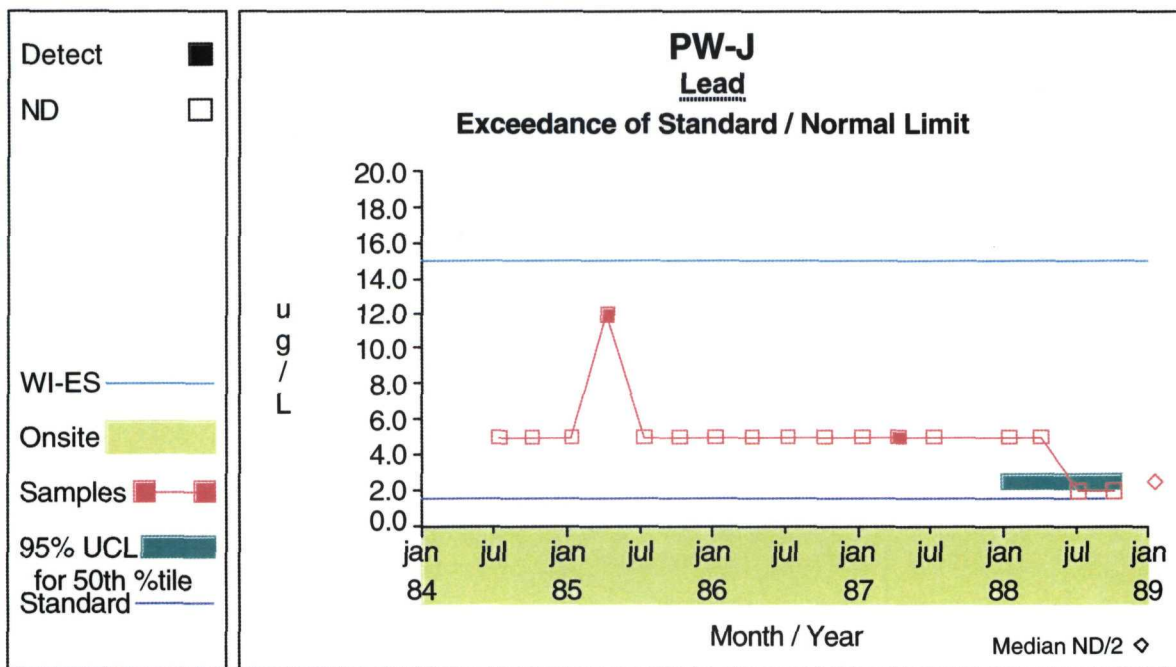
Comparison to Standard**Graph 254****Graph 255**

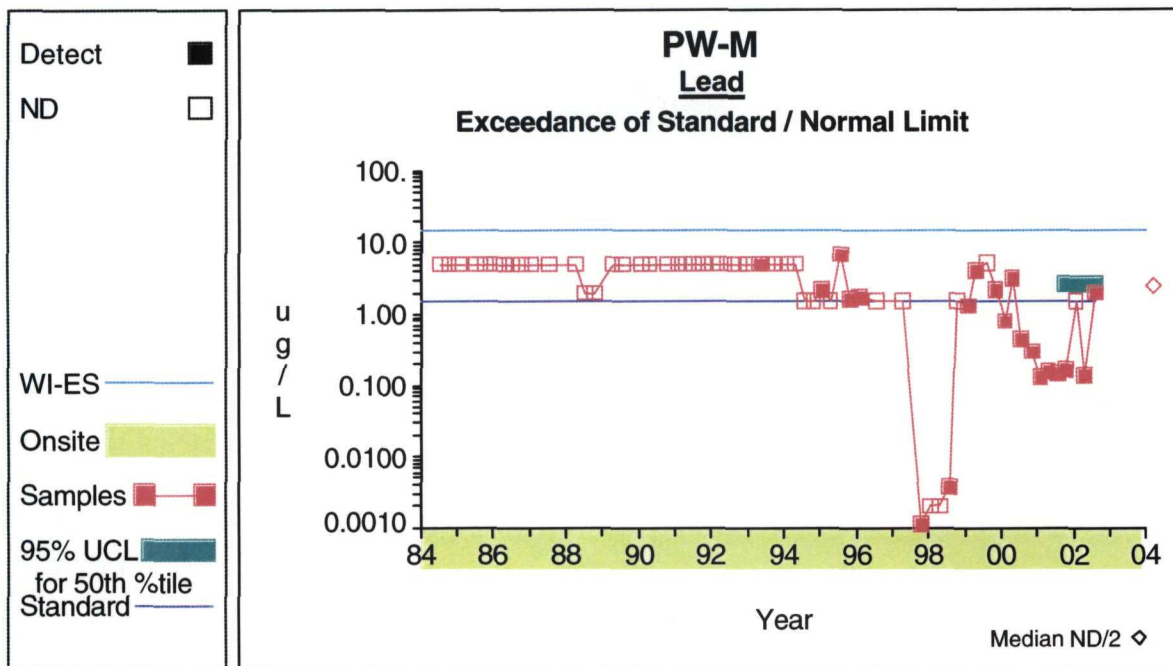
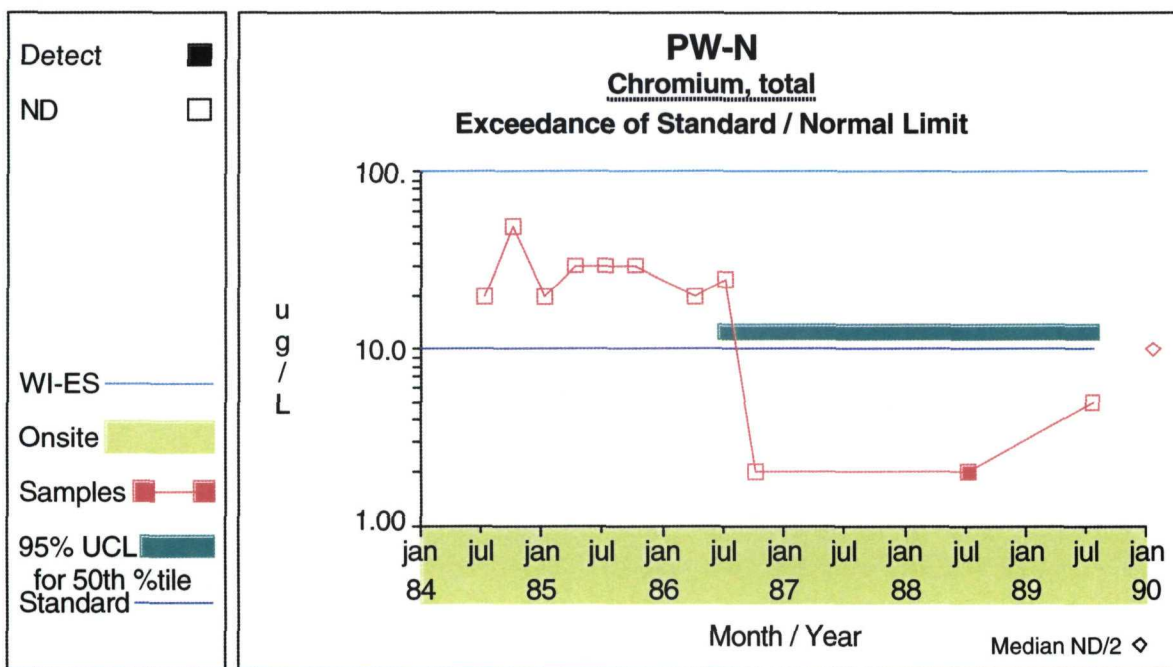
Comparison to Standard**Graph 256****Graph 257**

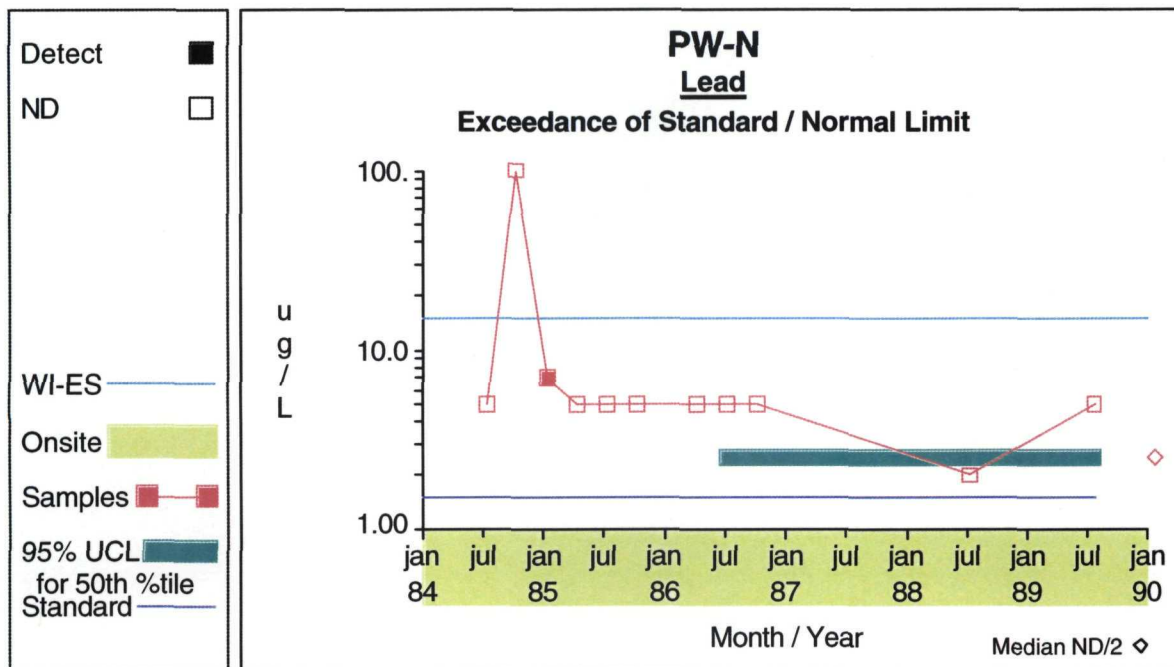
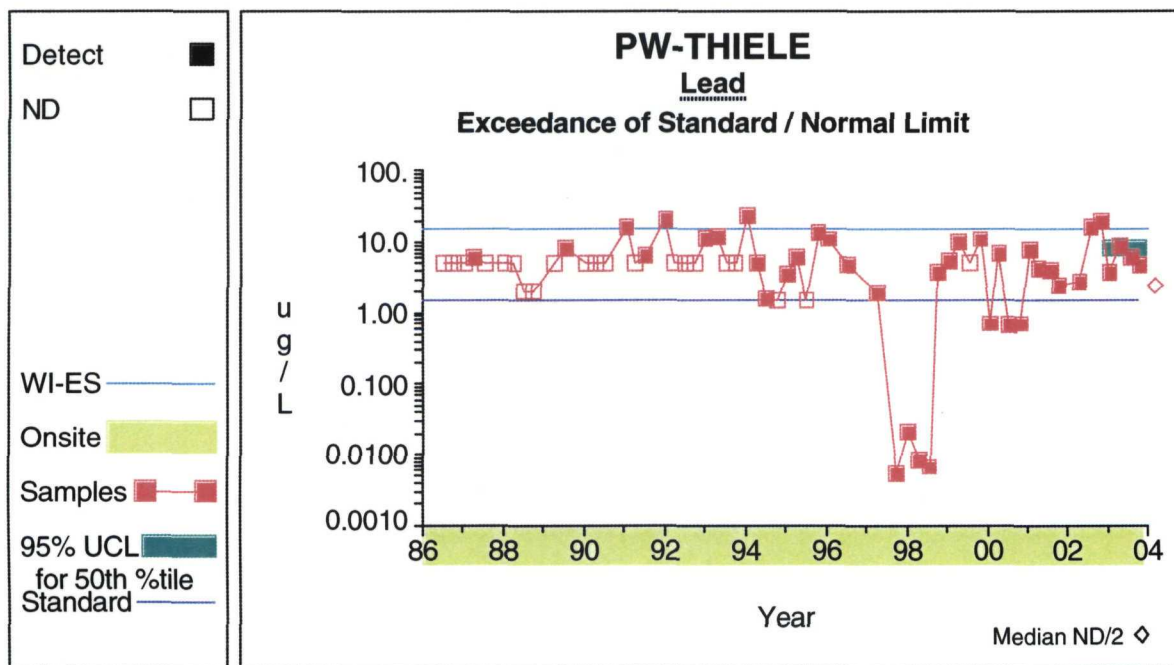
Comparison to Standard**Graph 266****Graph 276**

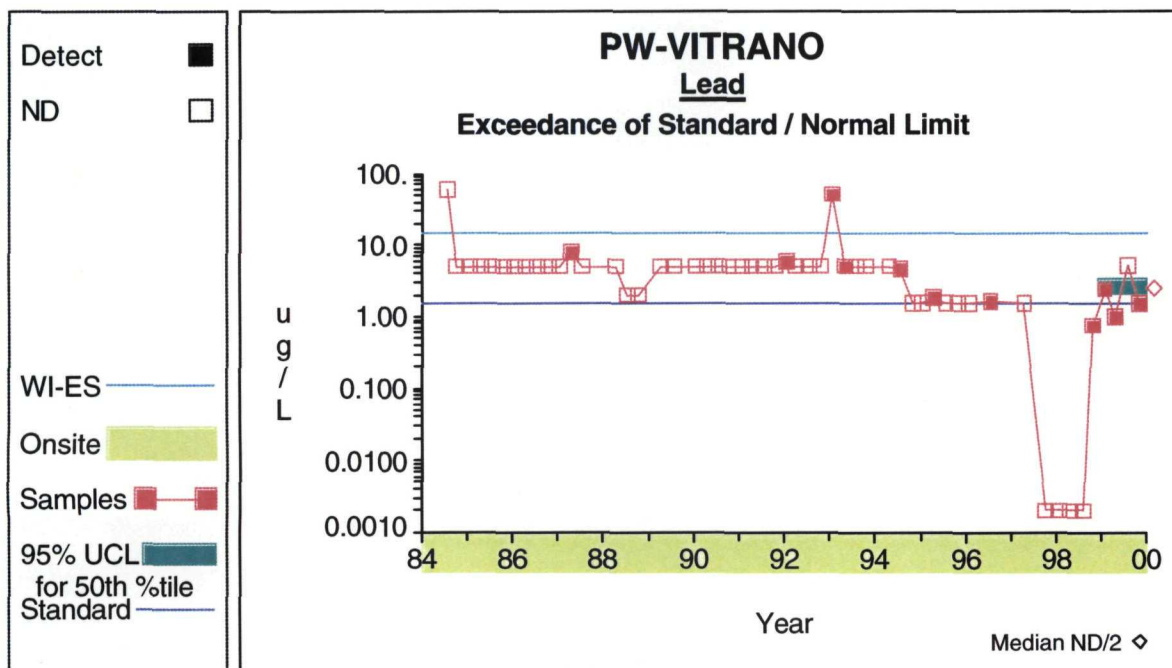
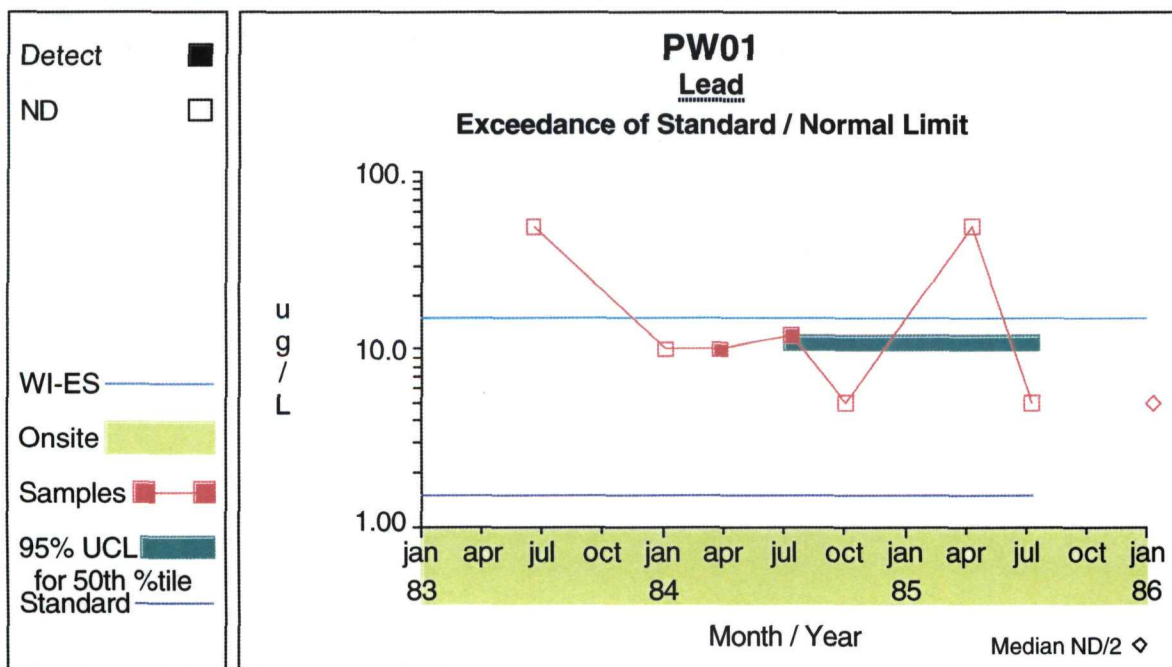
Comparison to Standard**Graph 286****Graph 296**

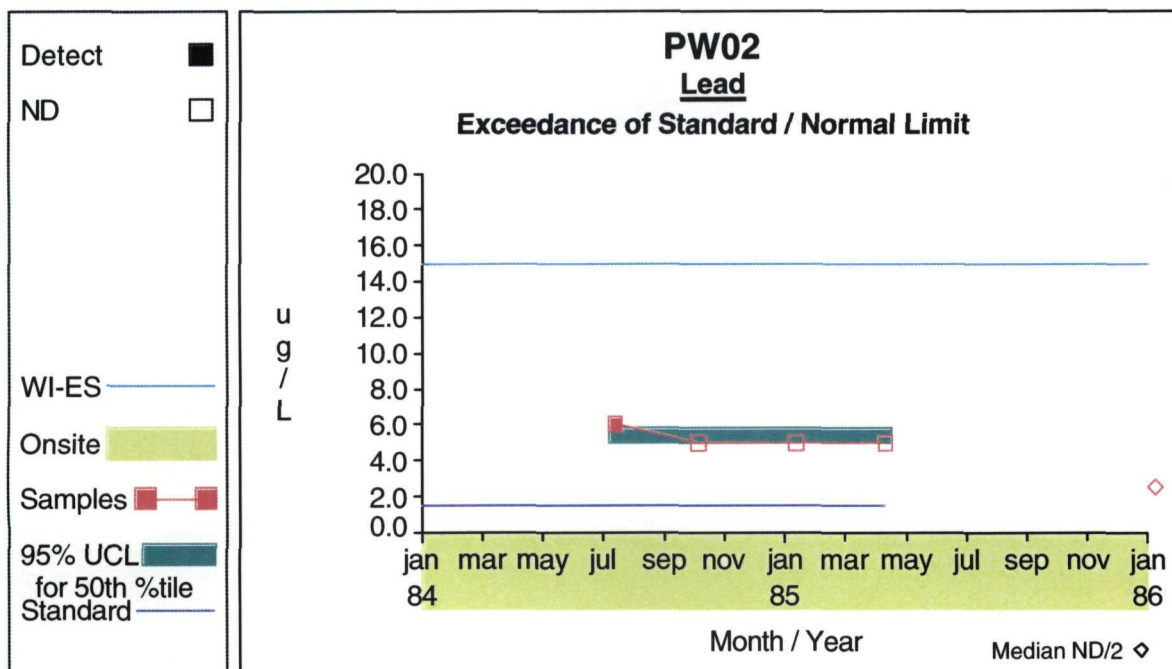
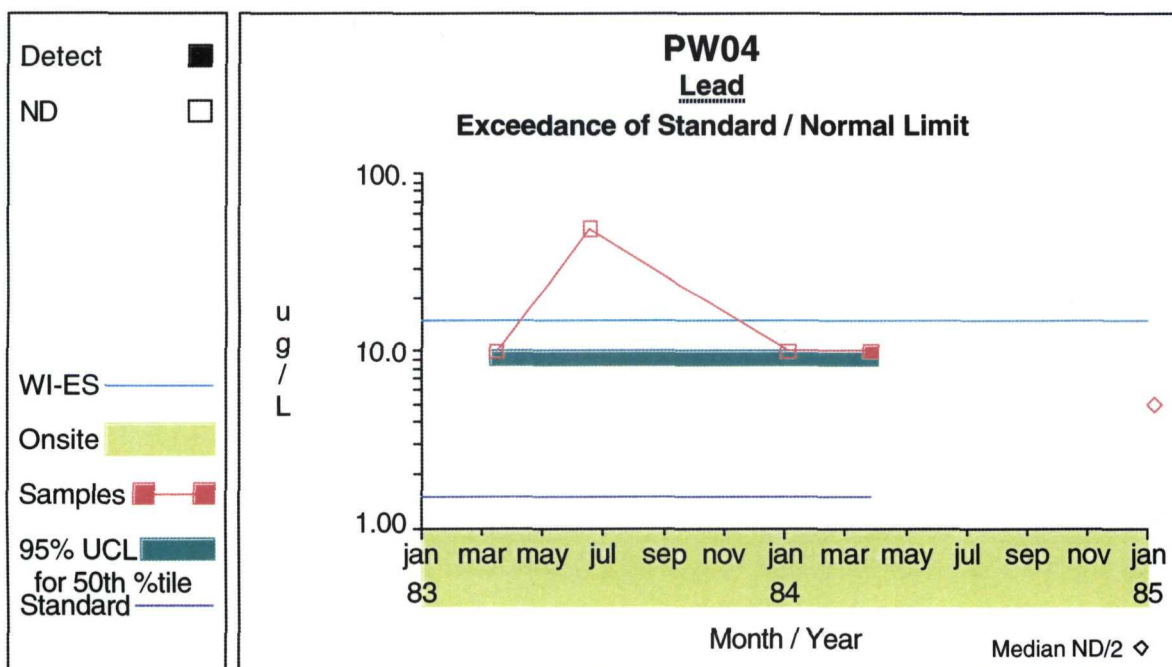
Comparison to Standard**Graph 306****Graph 316**

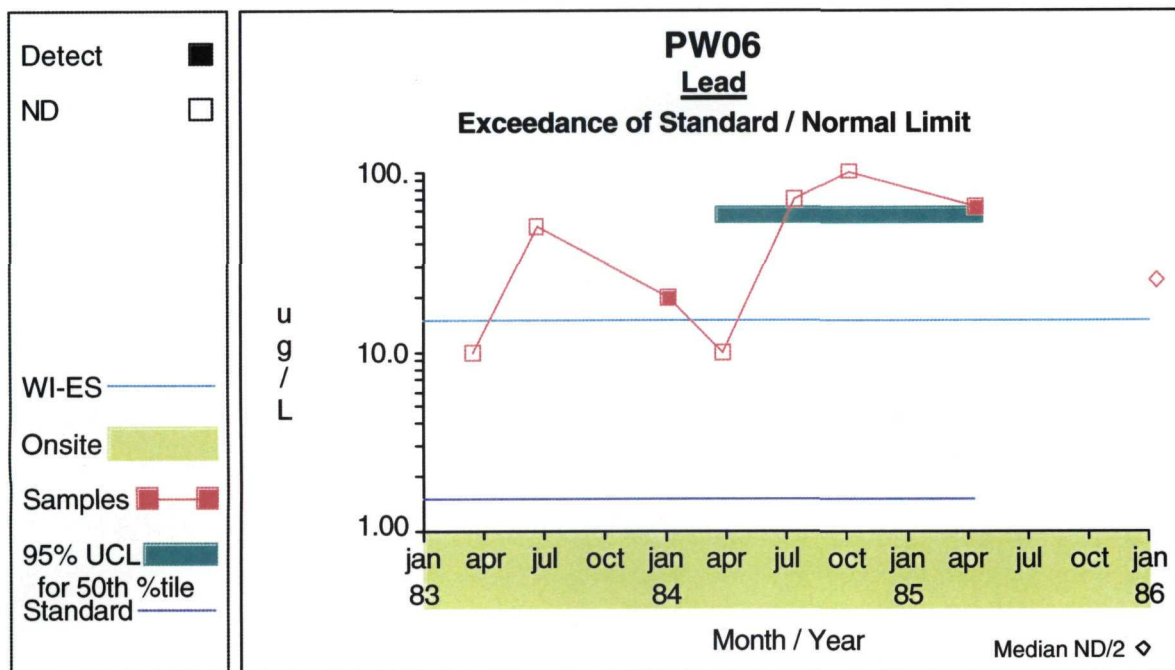
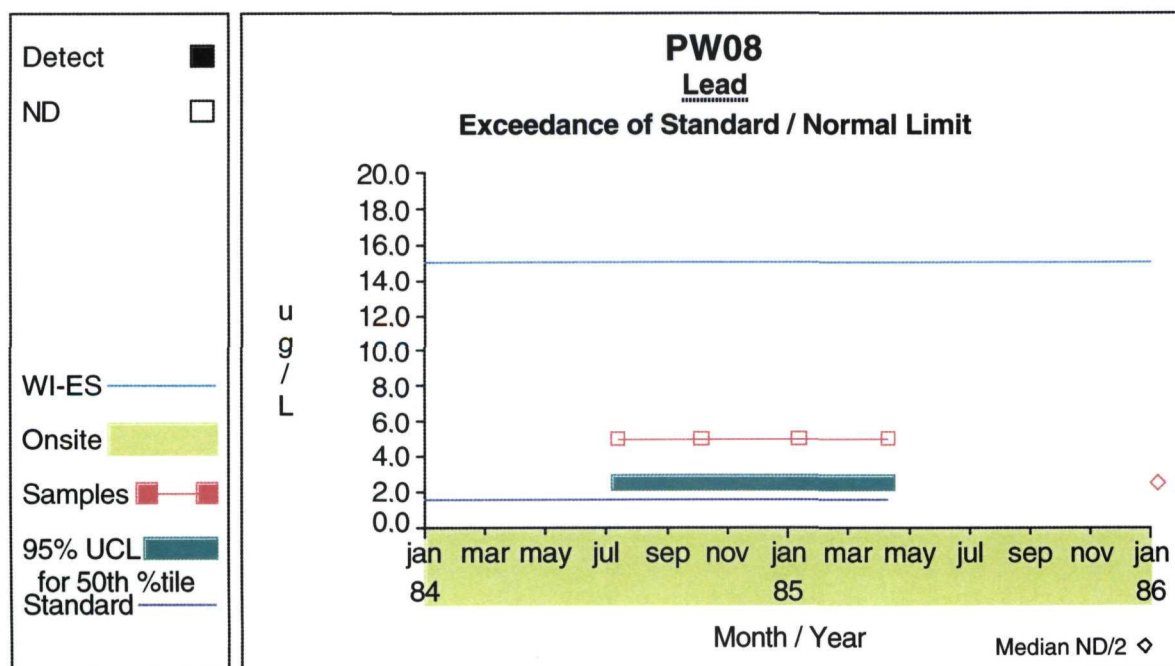
Comparison to Standard**Graph 336****Graph 346**

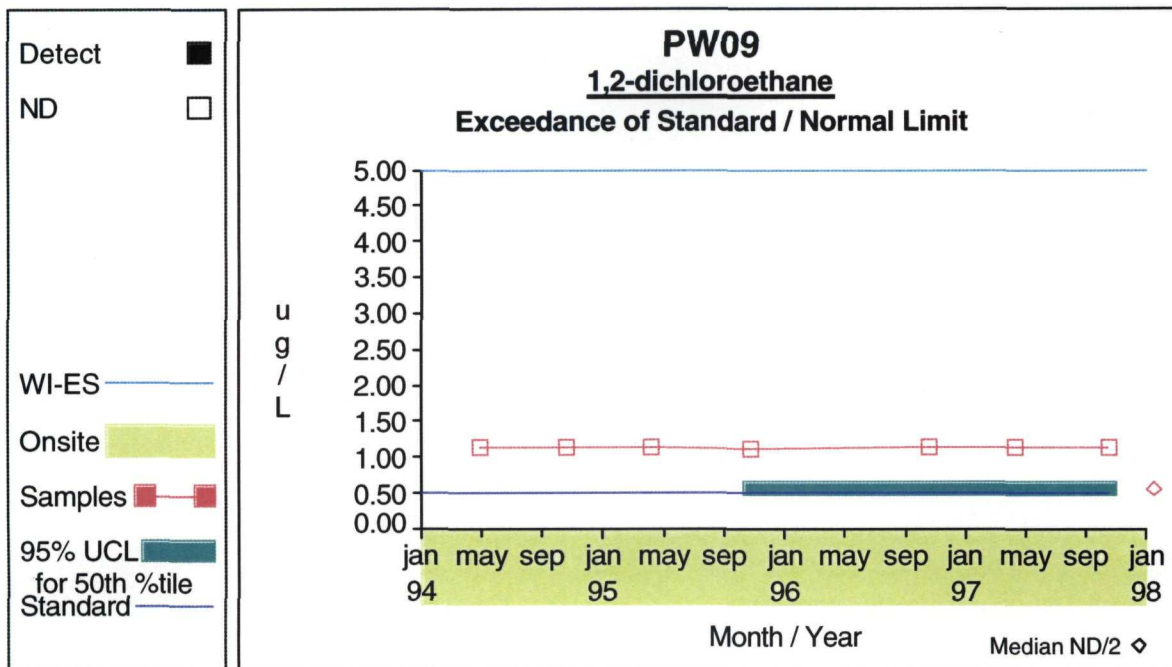
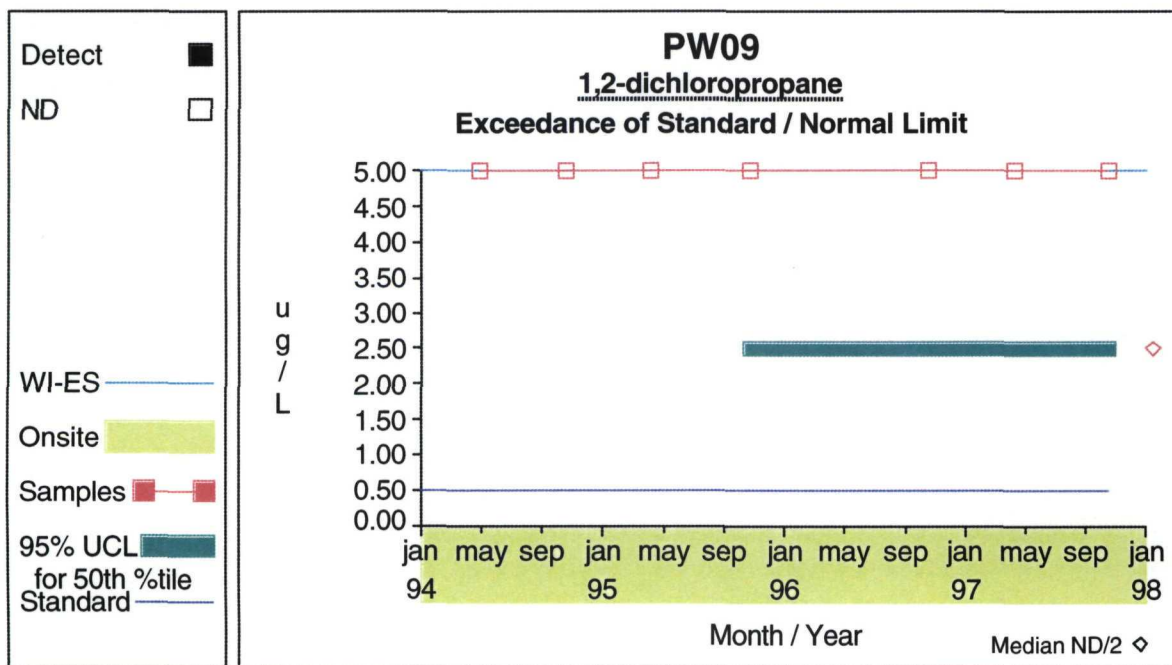
Comparison to Standard**Graph 356****Graph 364**

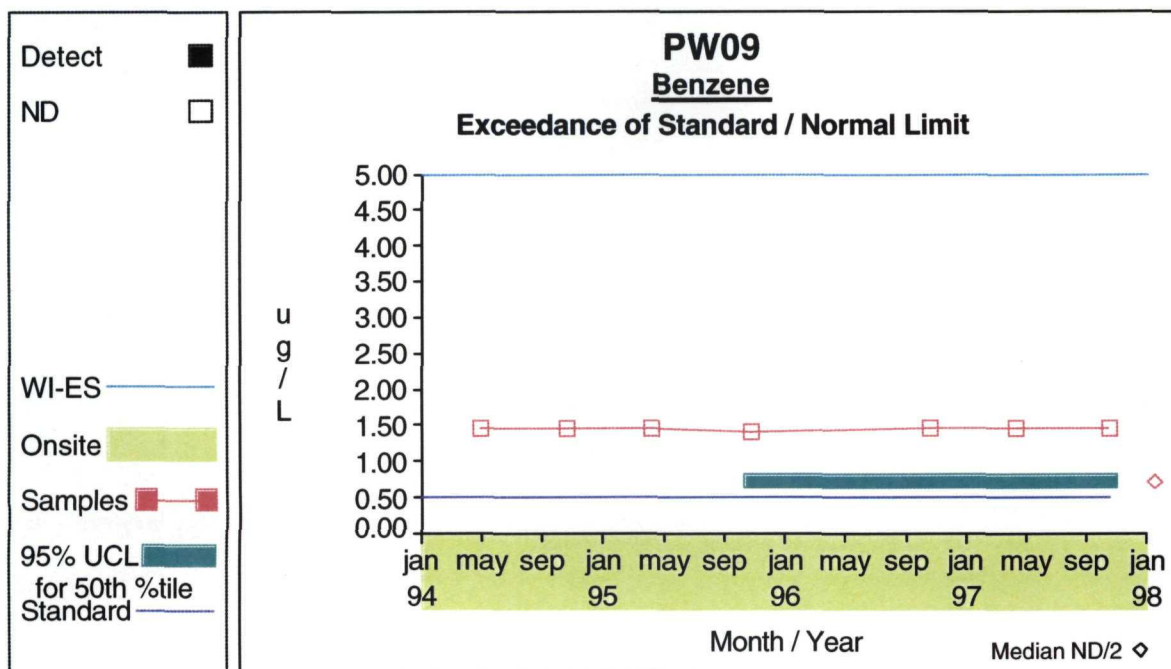
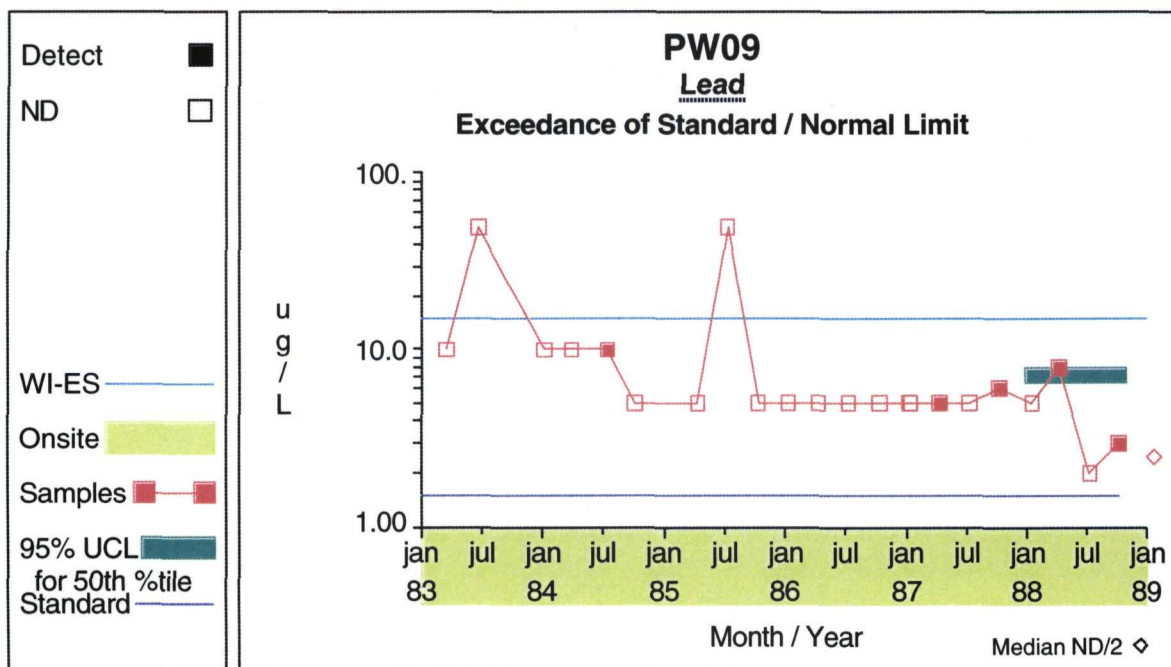
Comparison to Standard**Graph 366****Graph 376**

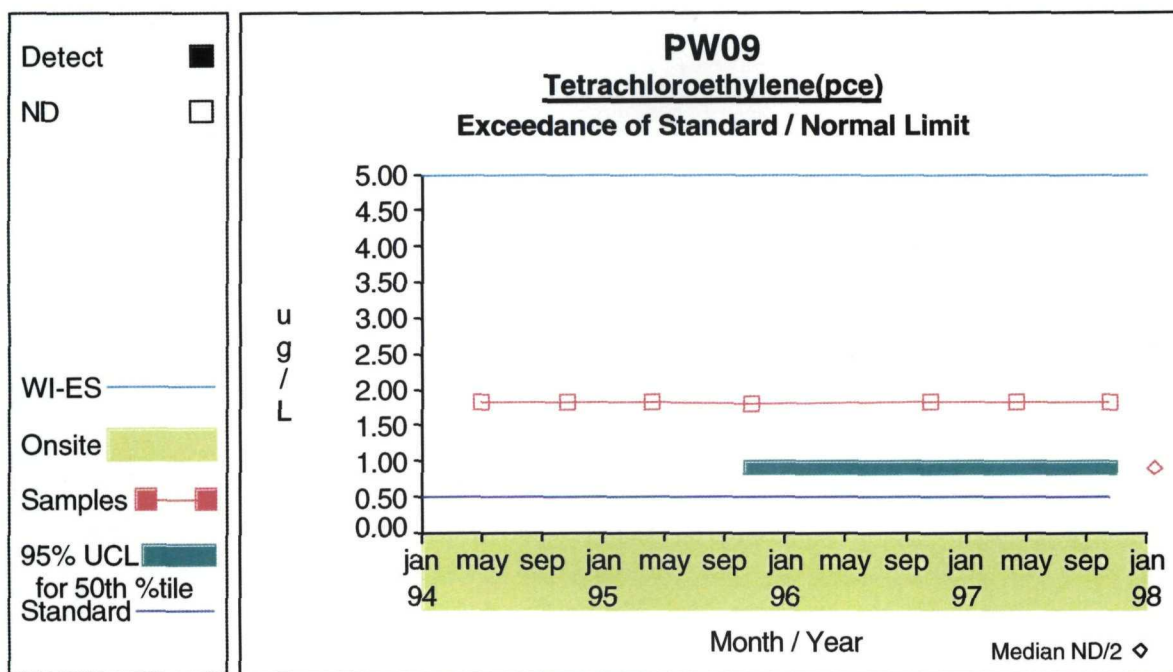
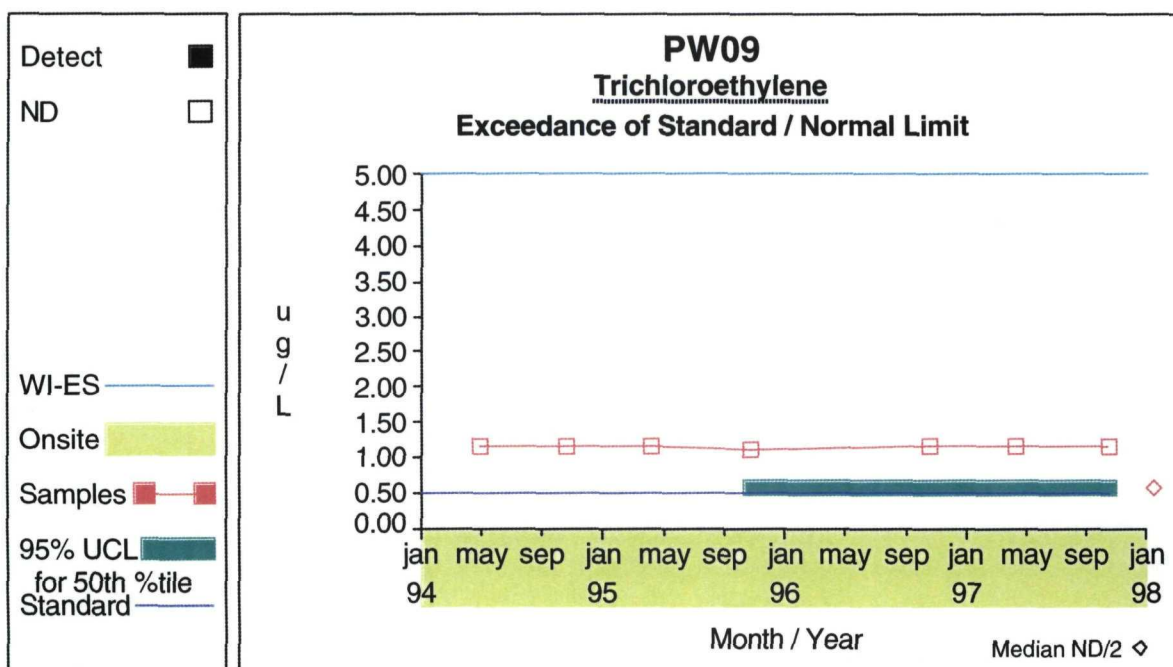
Comparison to Standard**Graph 386****Graph 396**

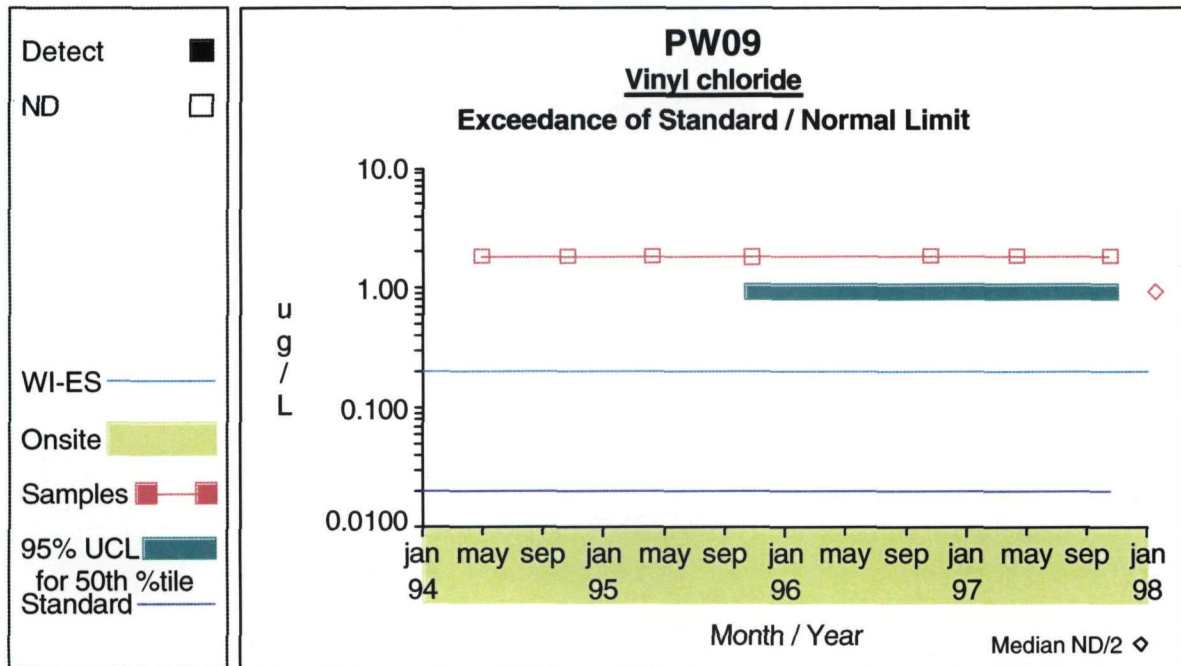
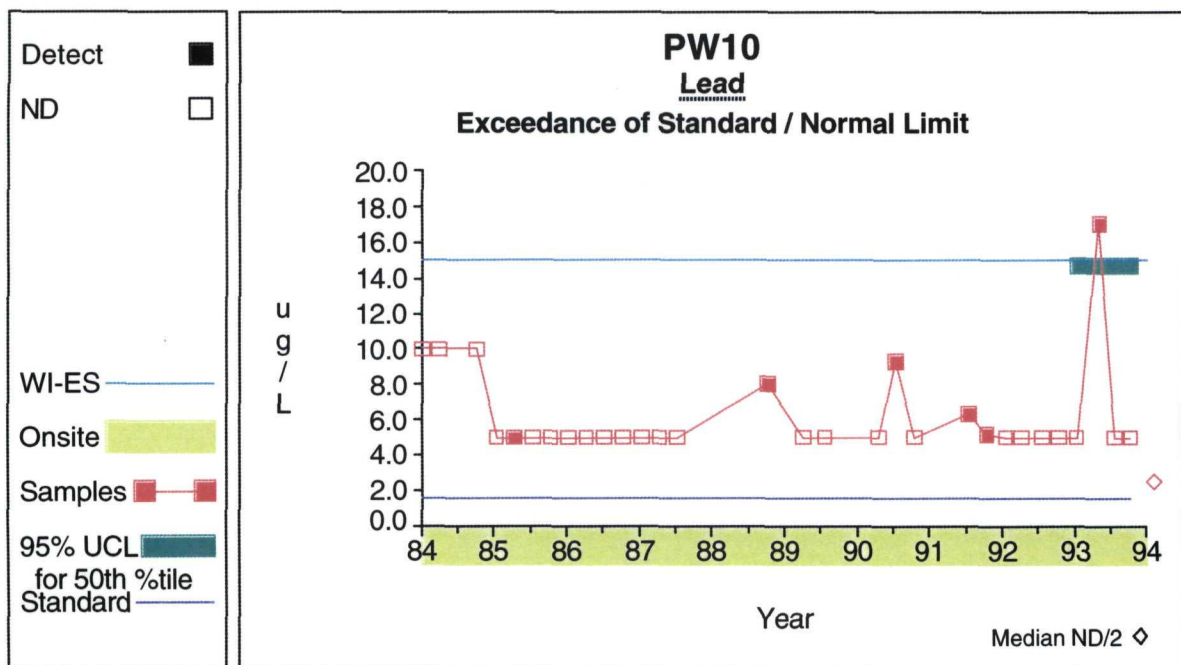
Comparison to Standard**Graph 406****Graph 416**

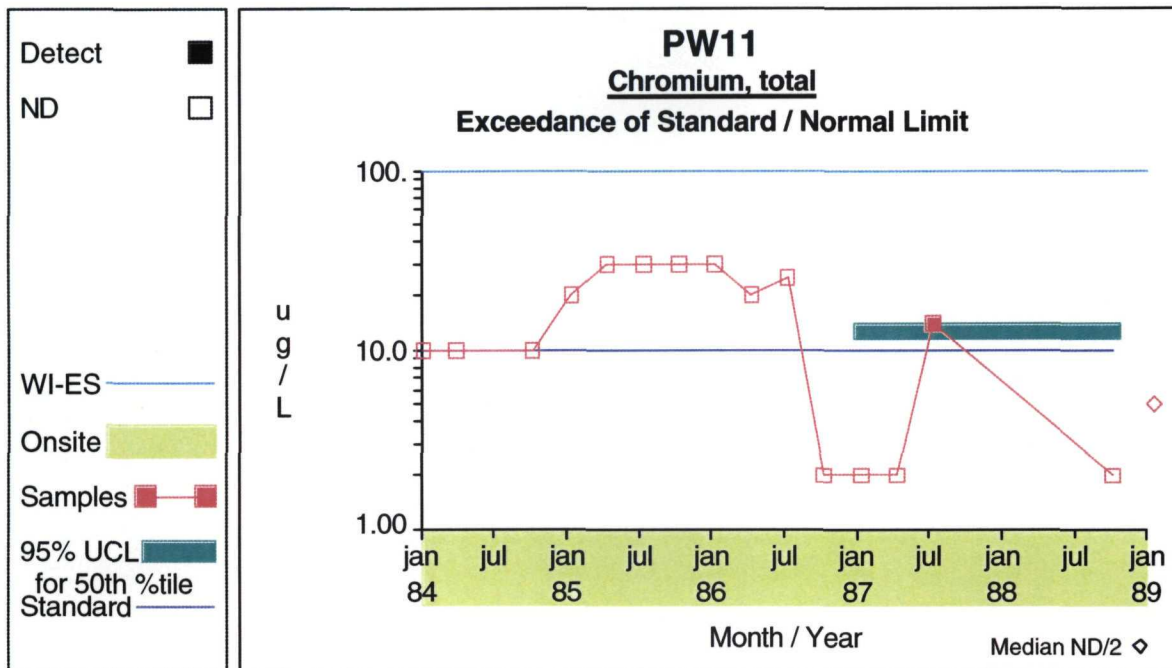
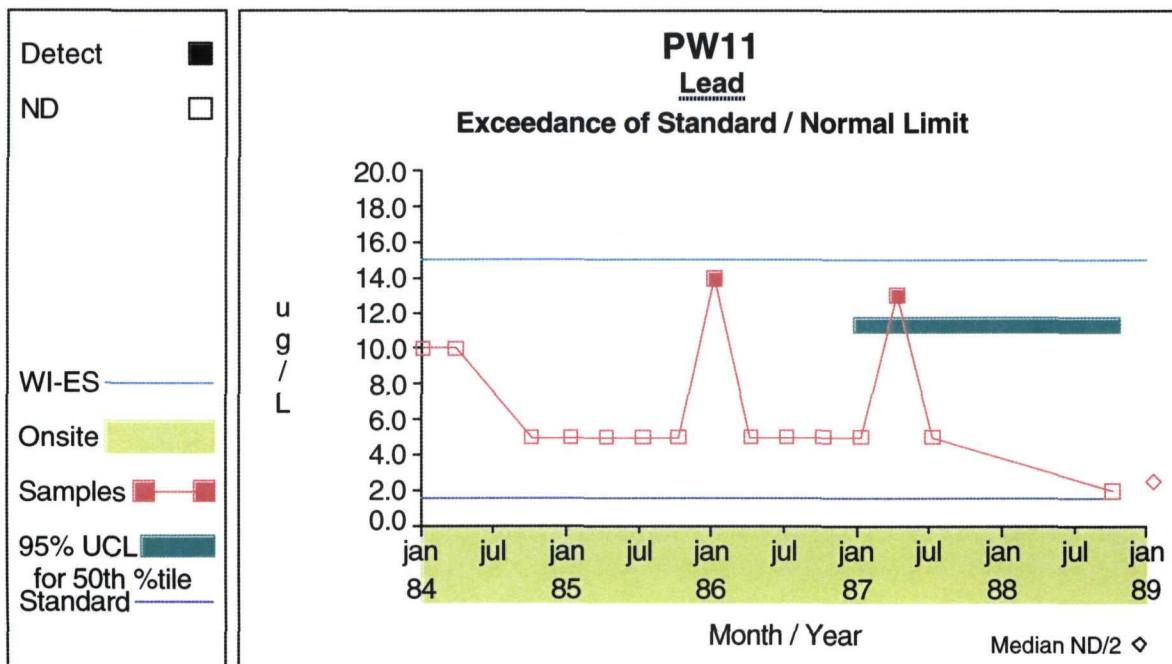
Comparison to Standard**Graph 426****Graph 436**

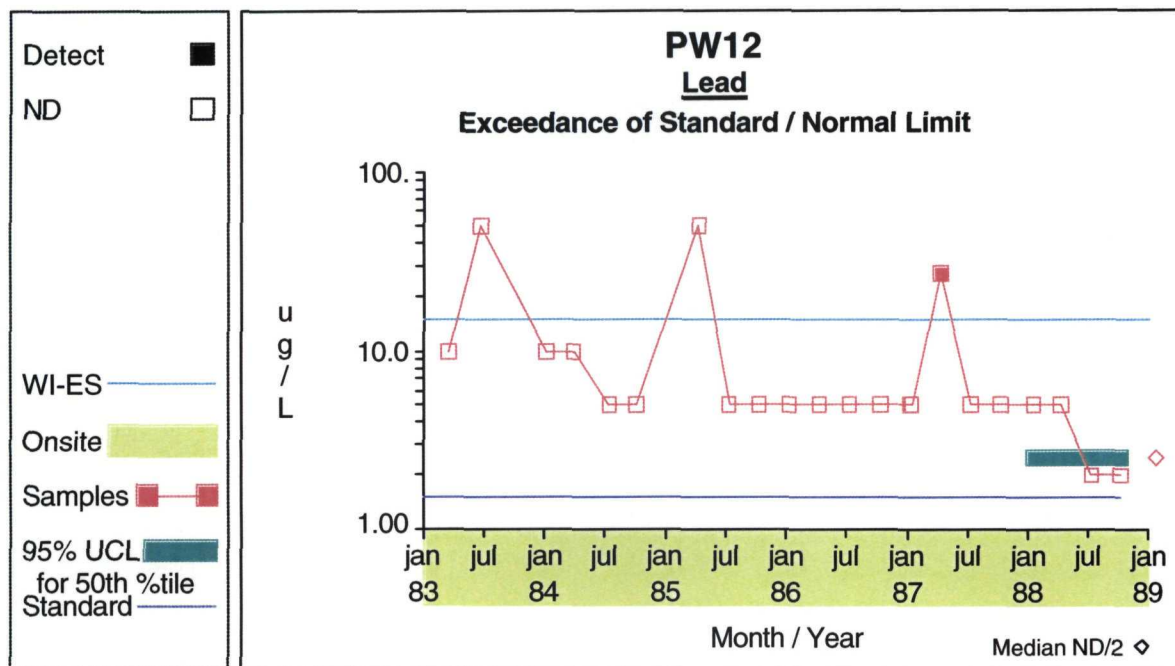
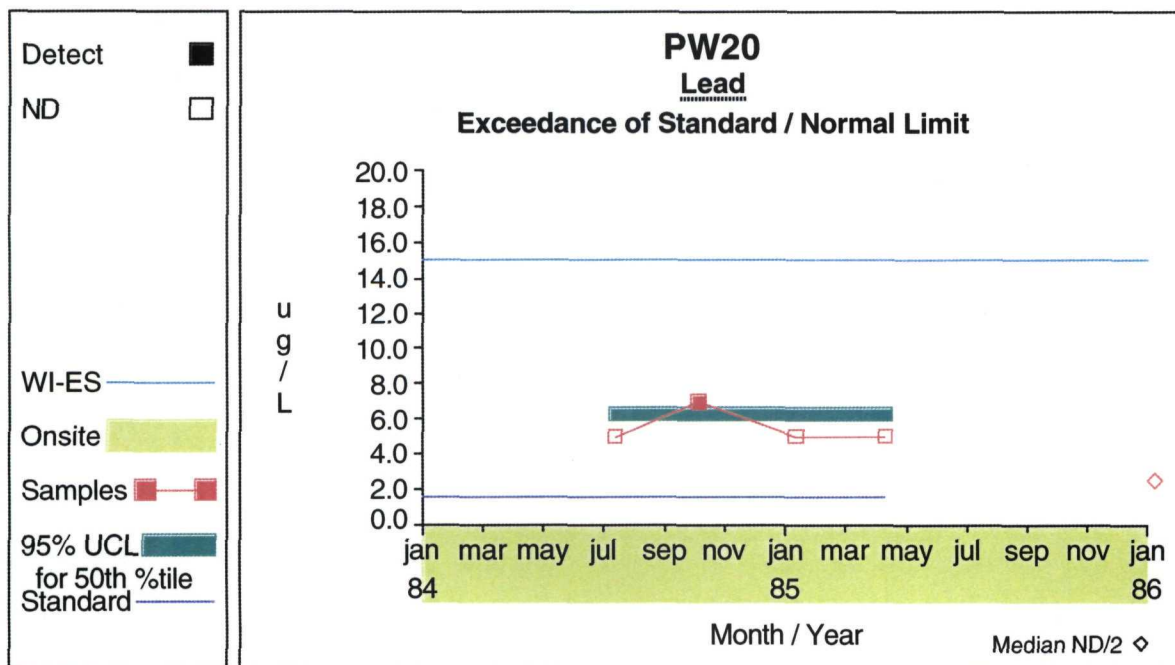
Comparison to Standard**Graph 441****Graph 442**

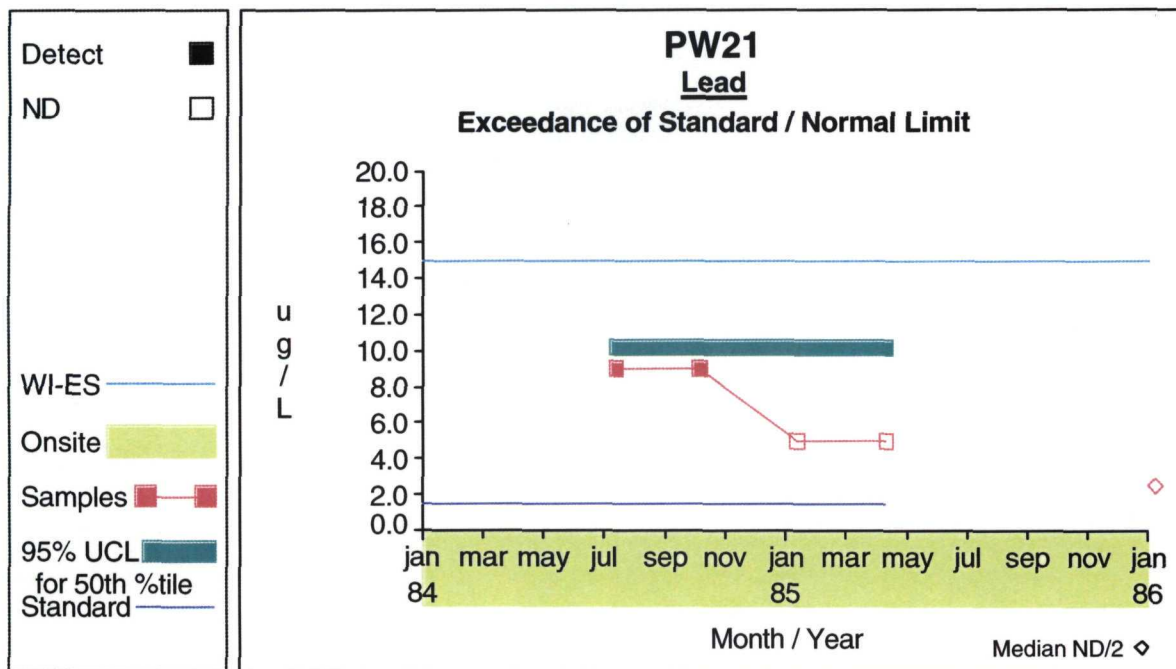
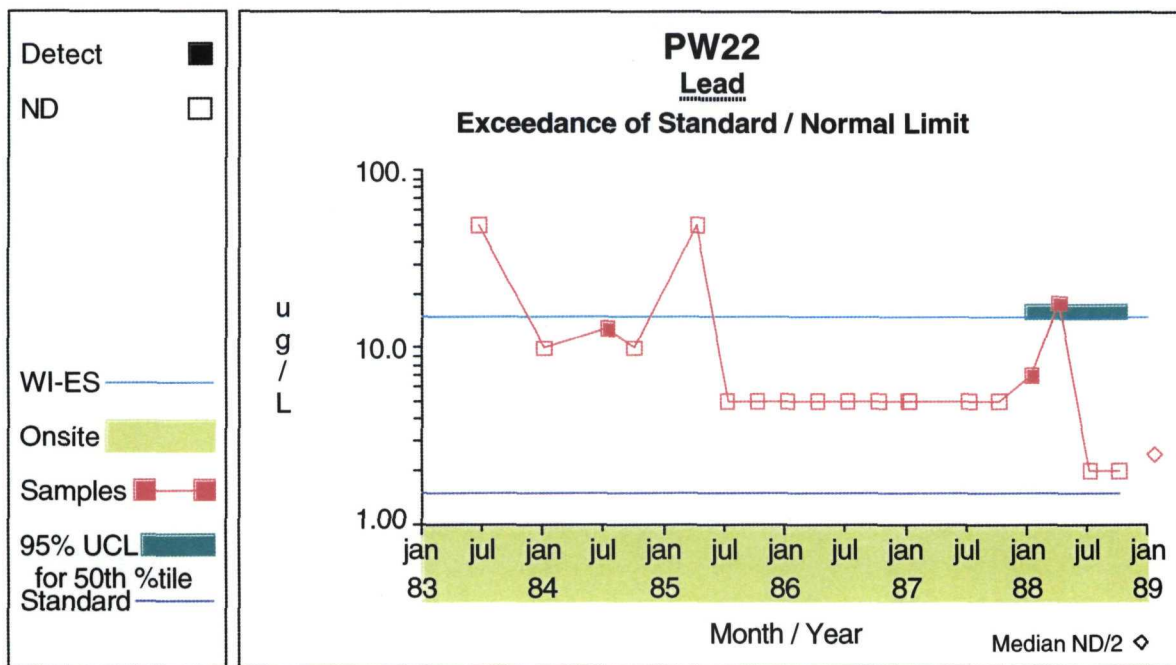
Comparison to Standard**Graph 443****Graph 446**

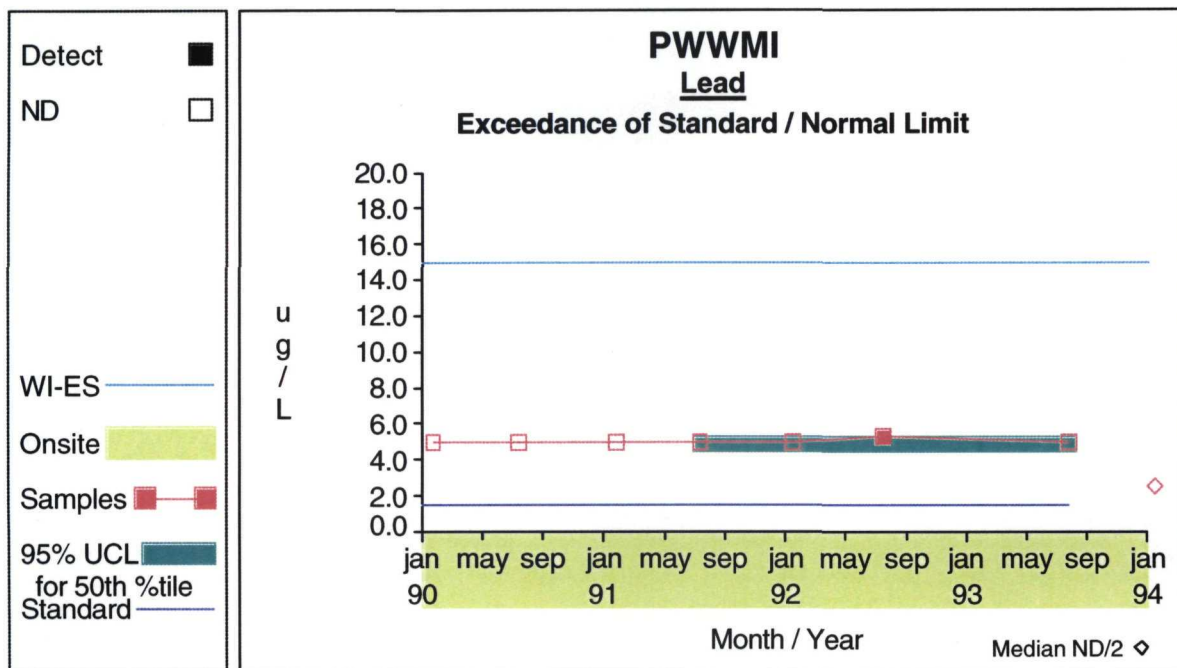
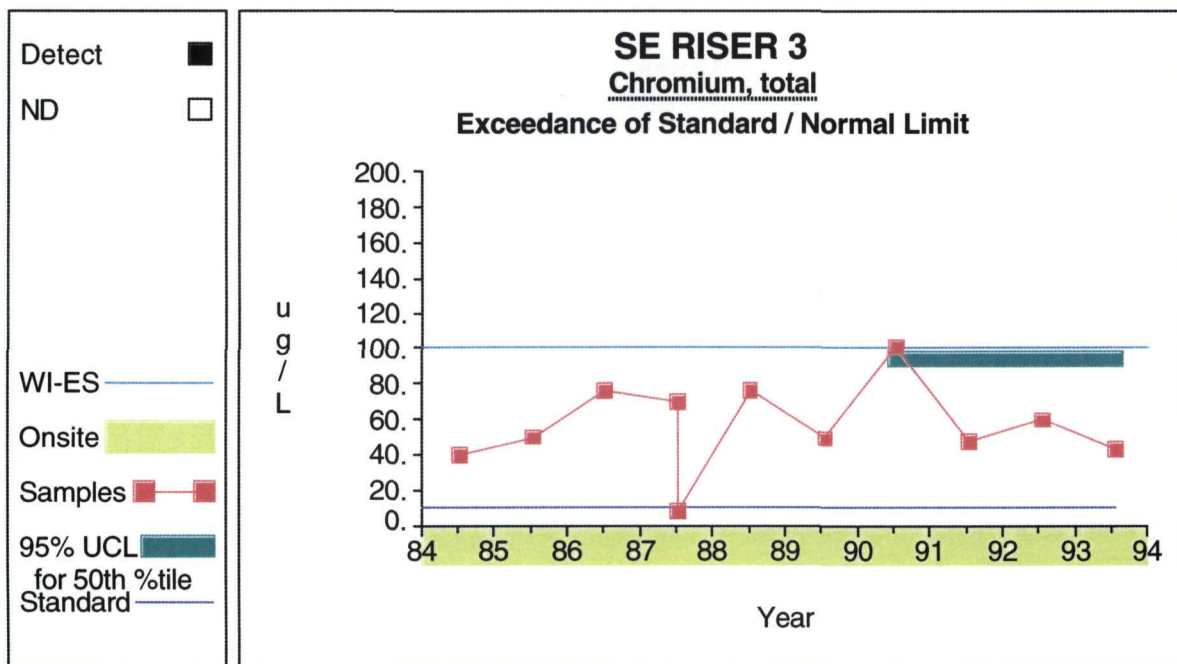
Comparison to Standard**Graph 448****Graph 449**

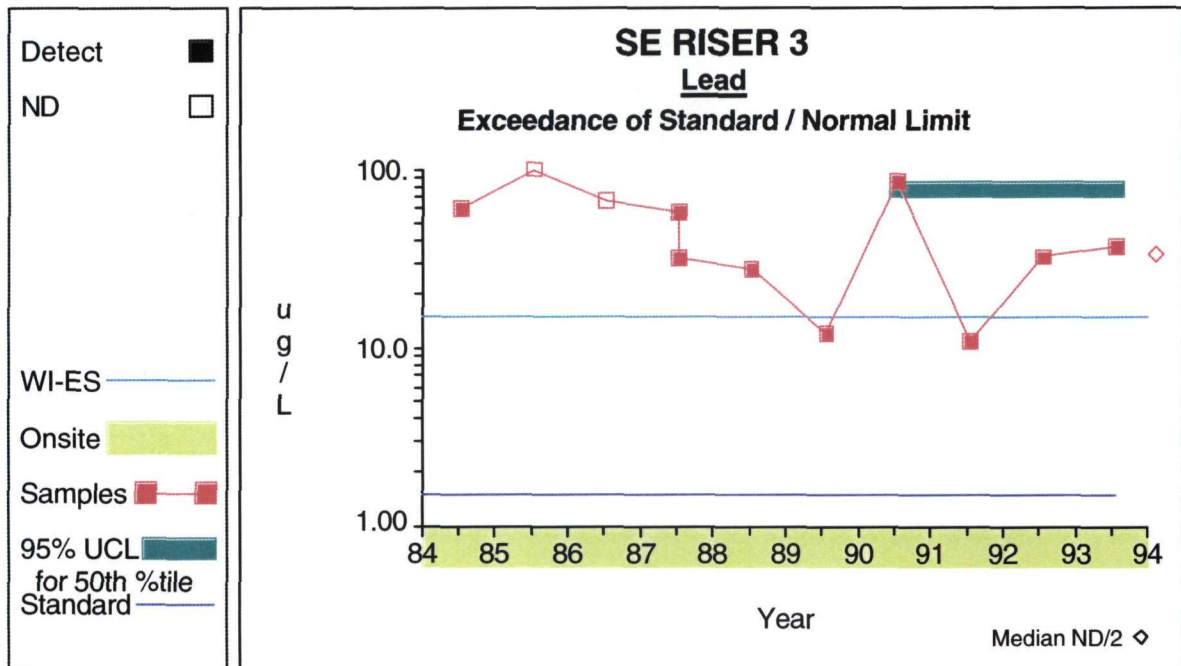
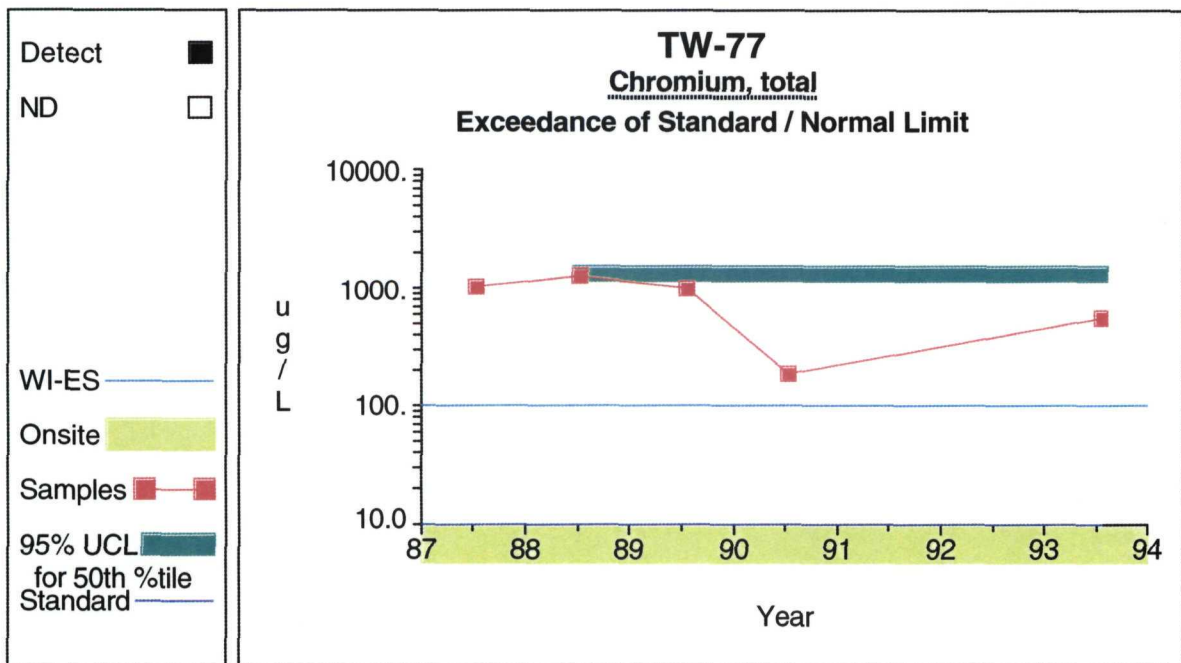
Comparison to Standard**Graph 450****Graph 456**

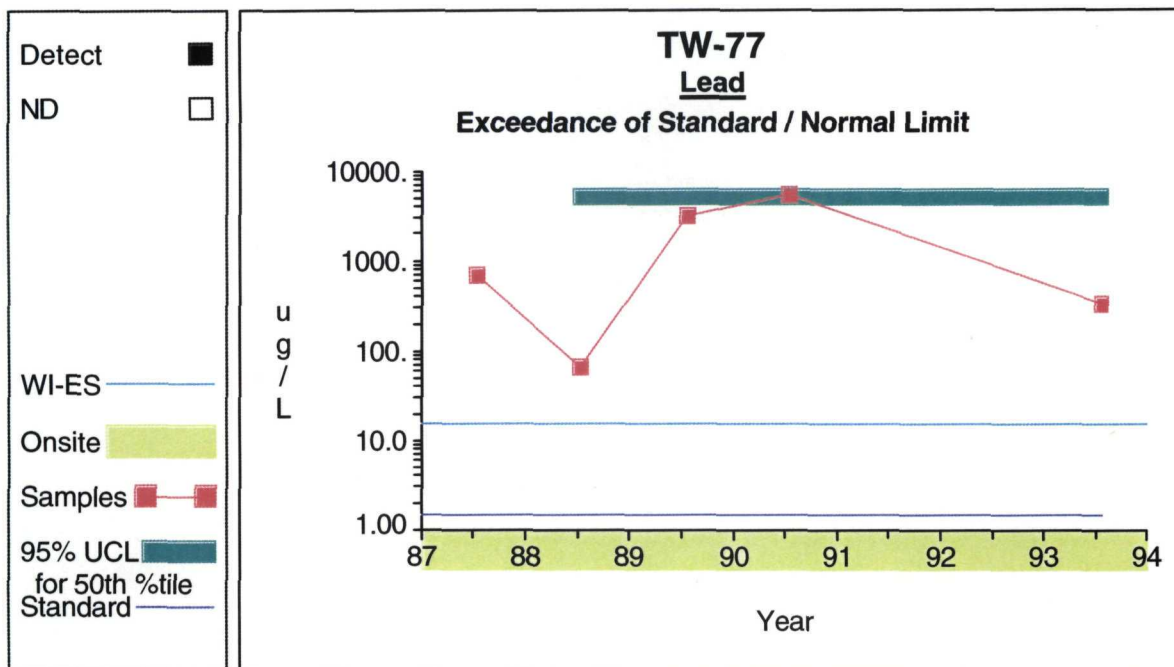
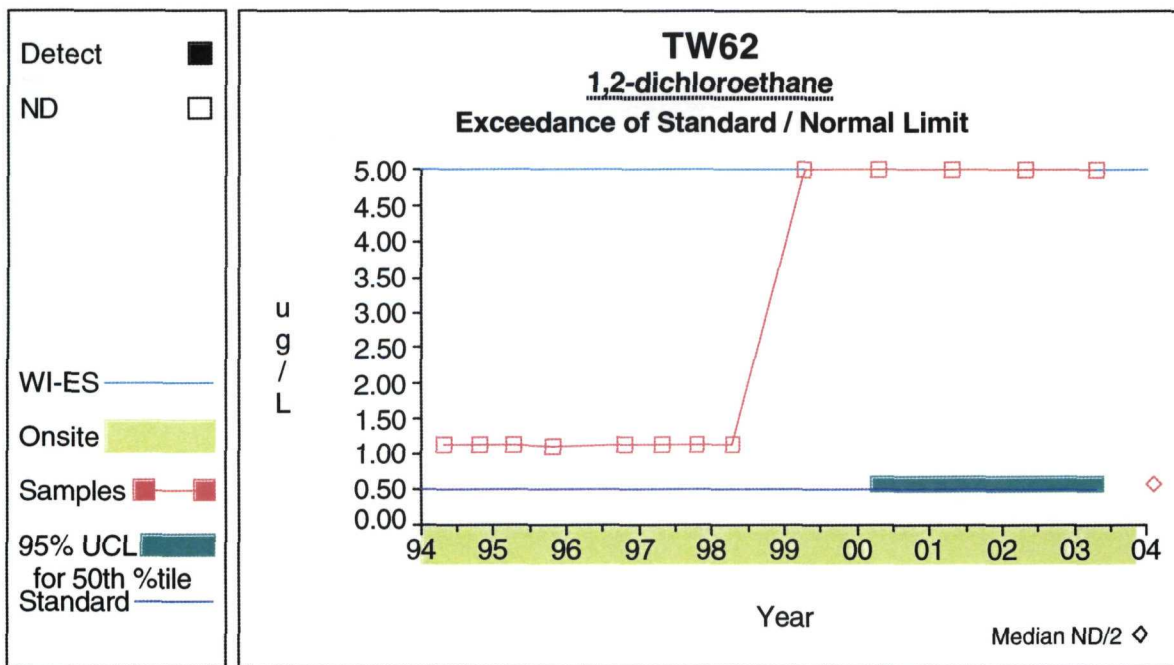
Comparison to Standard**Graph 464****Graph 466**

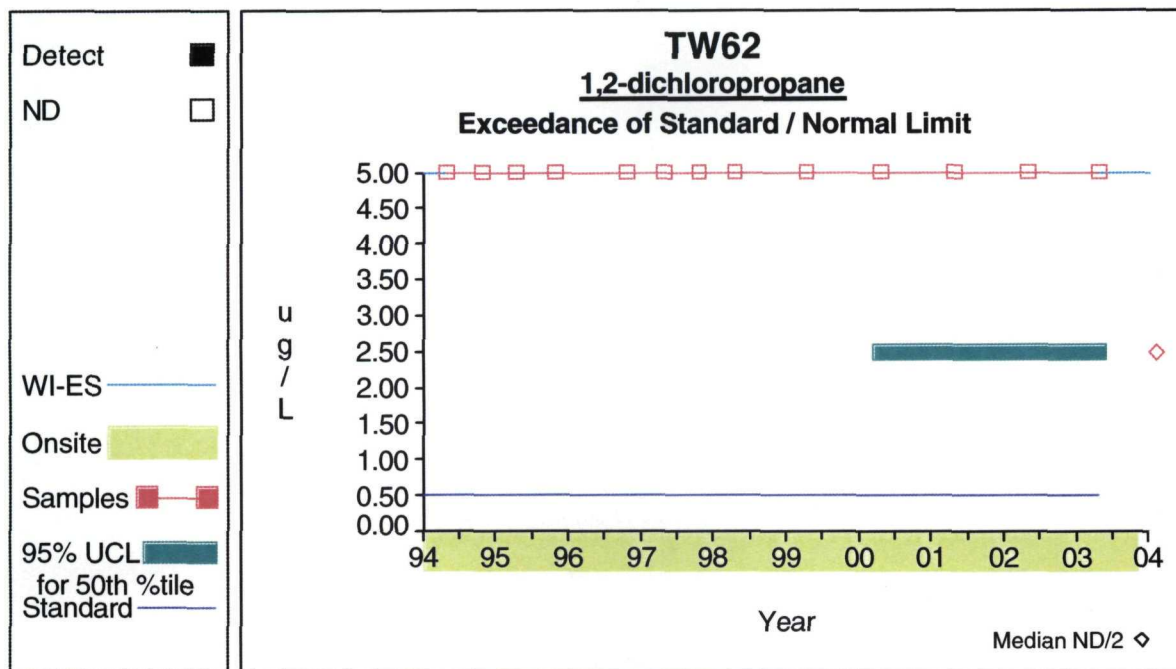
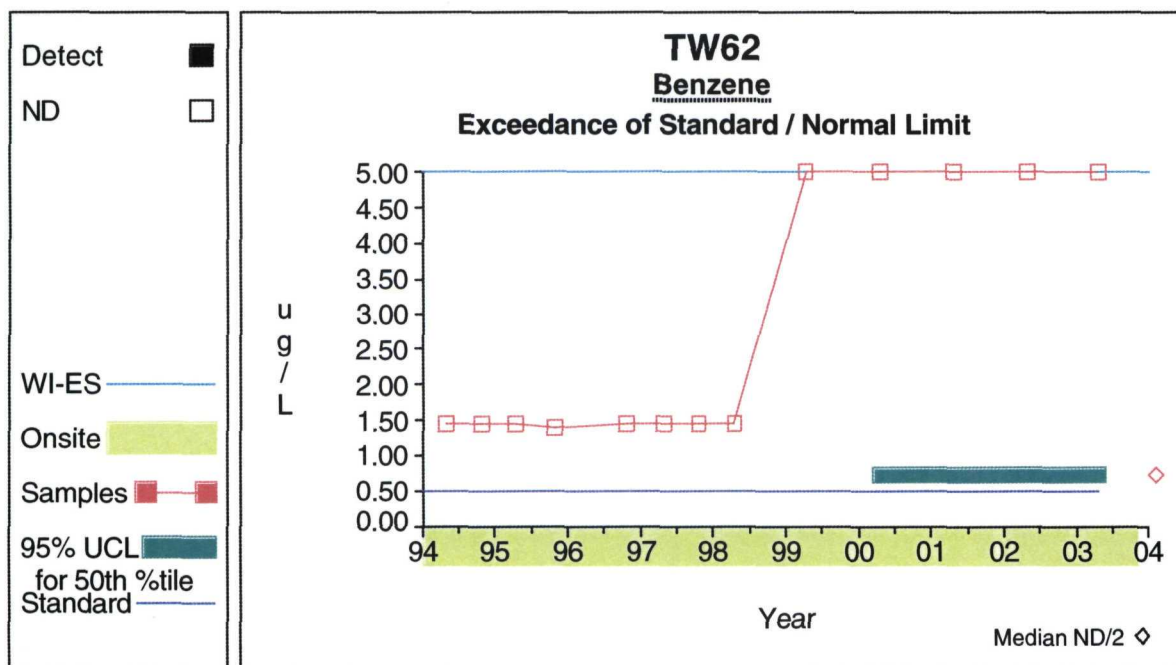
Comparison to Standard**Graph 476****Graph 486**

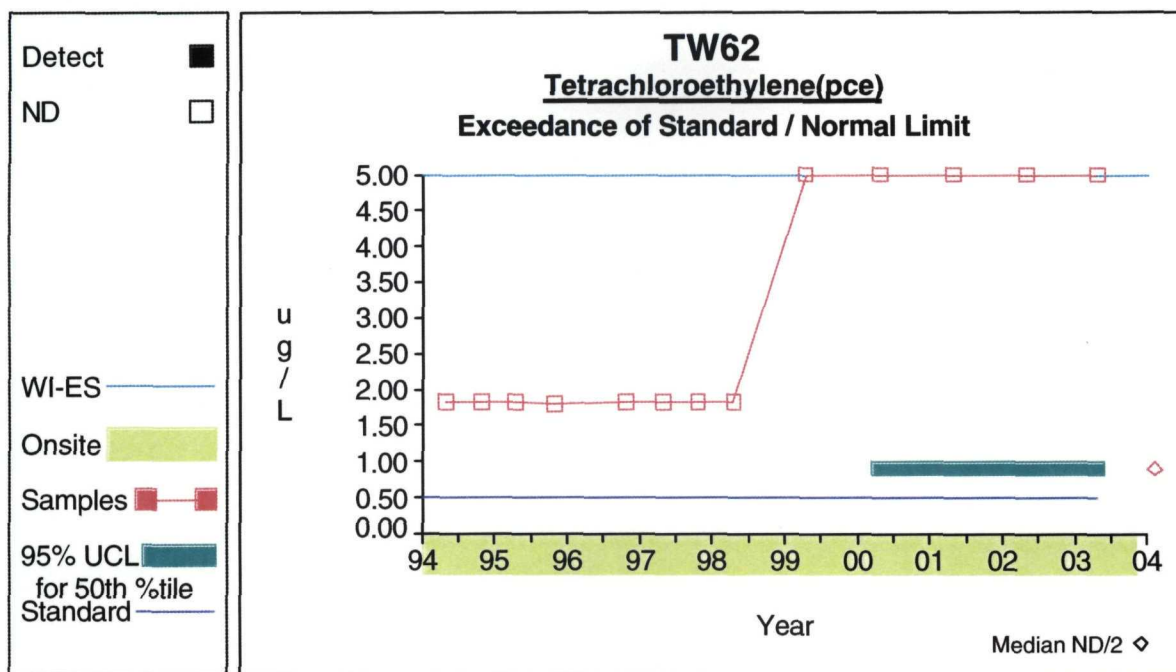
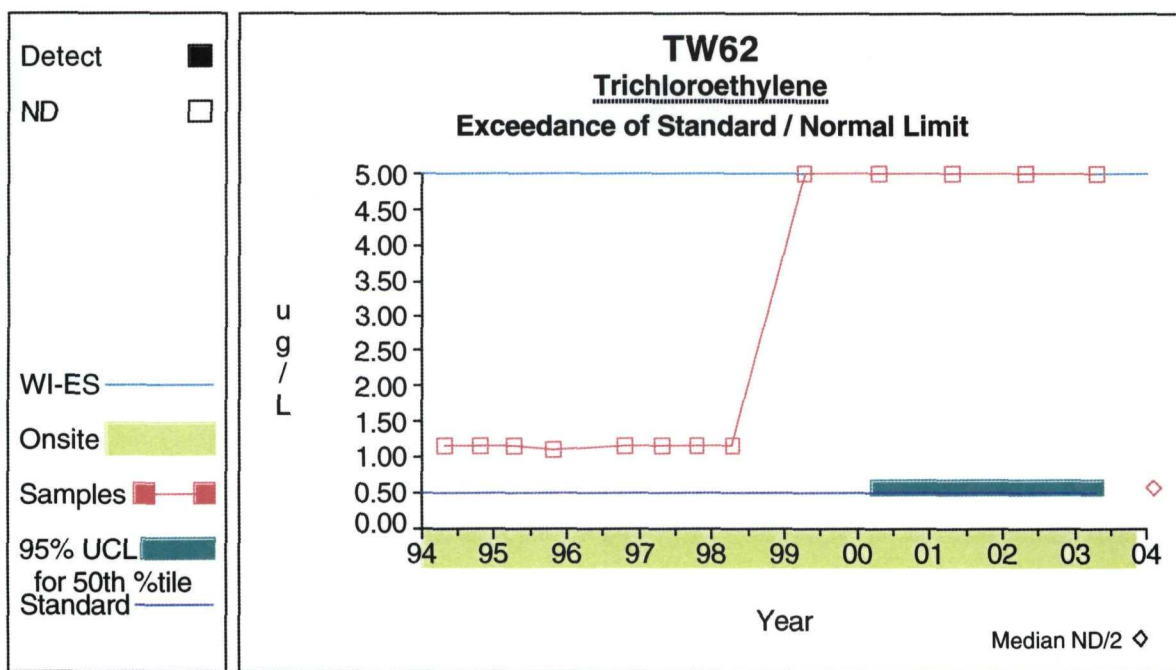
Comparison to Standard**Graph 496****Graph 506**

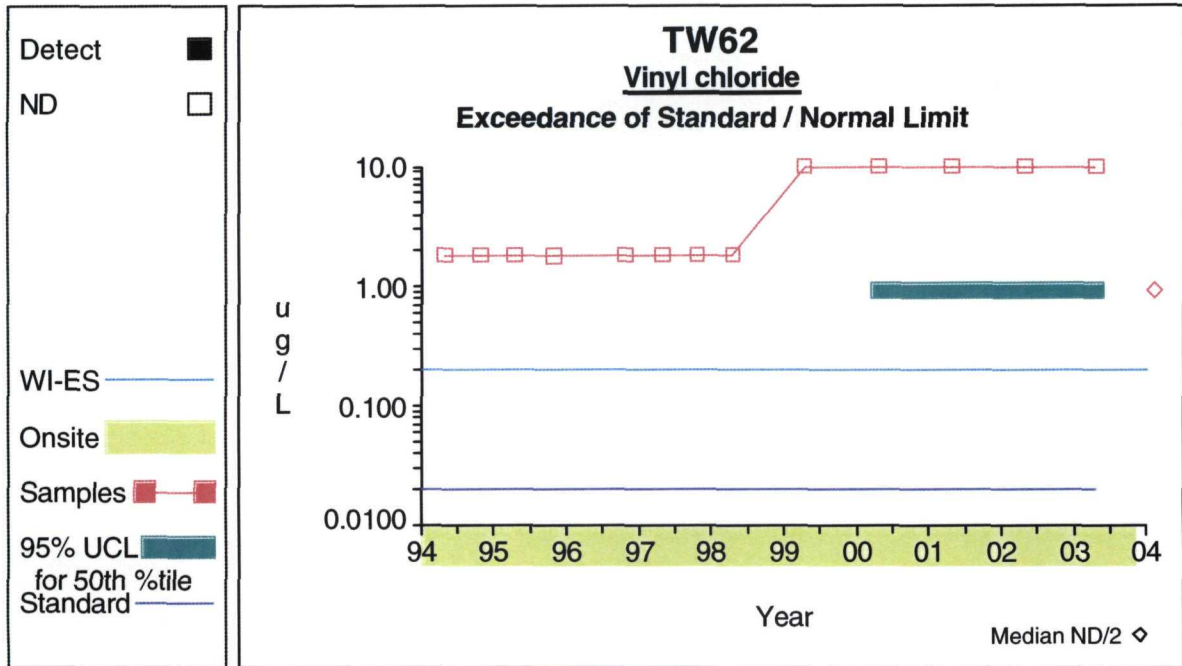
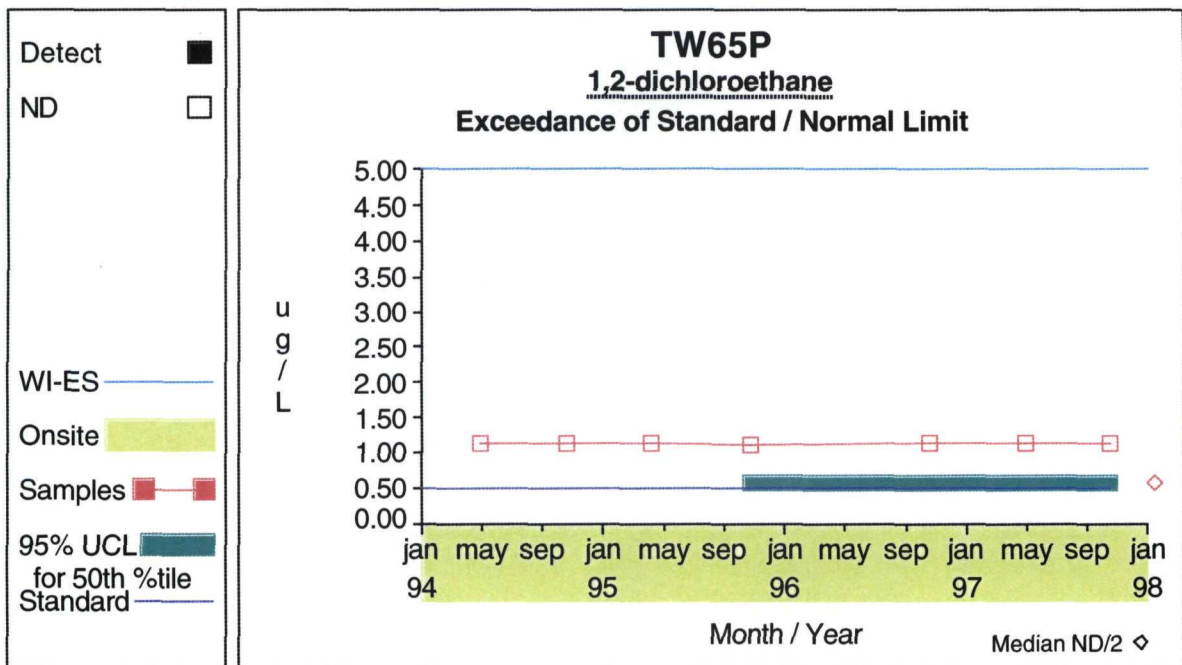
Comparison to Standard**Graph 516****Graph 524**

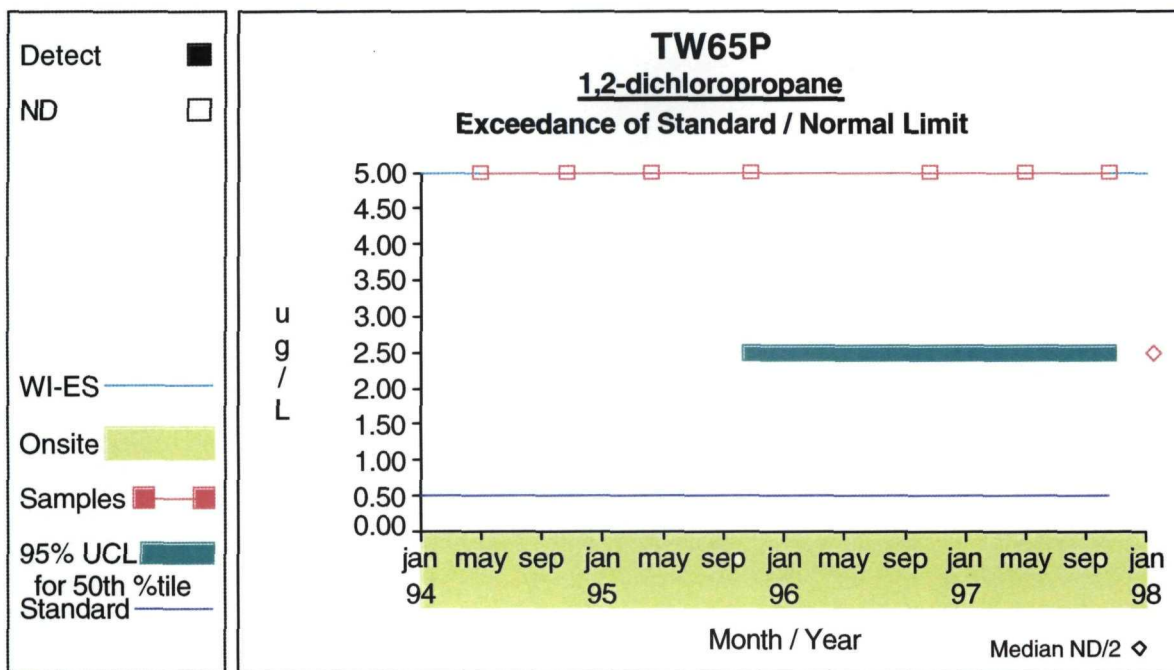
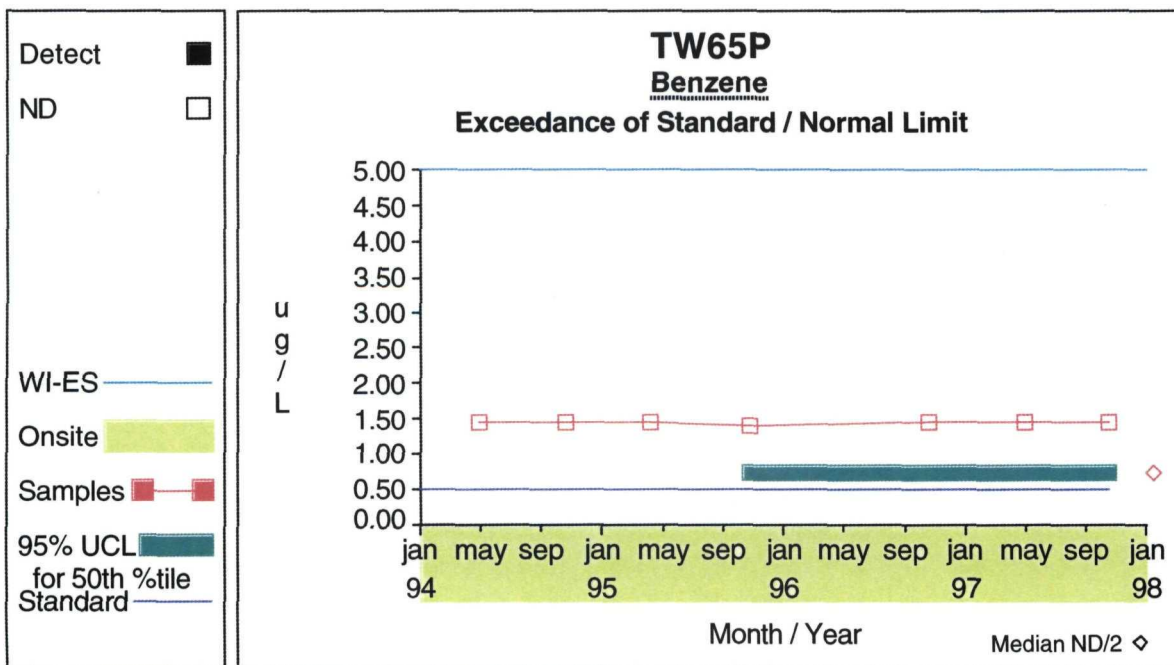
Comparison to Standard**Graph 526****Graph 534**

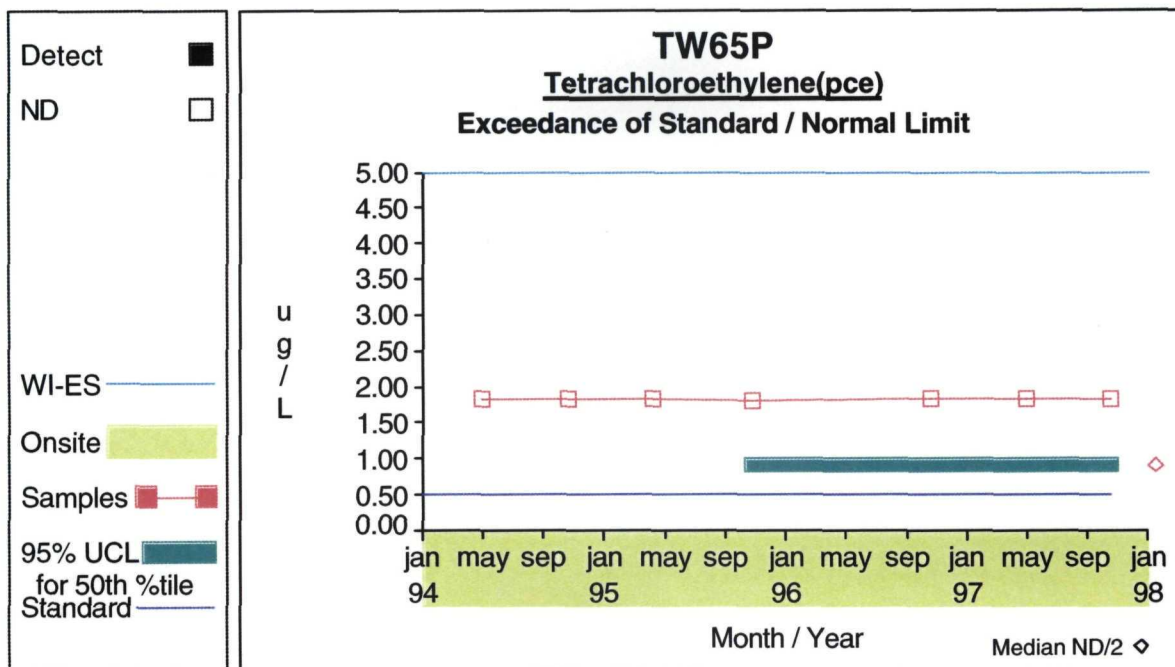
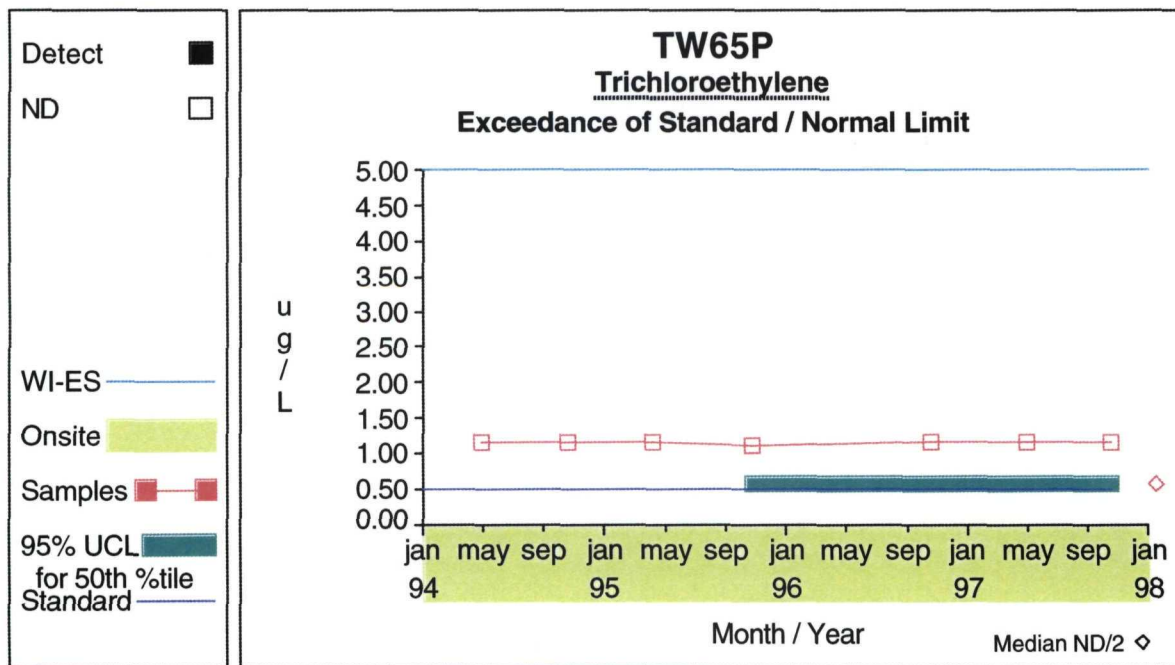
Comparison to Standard**Graph 536****Graph 541**

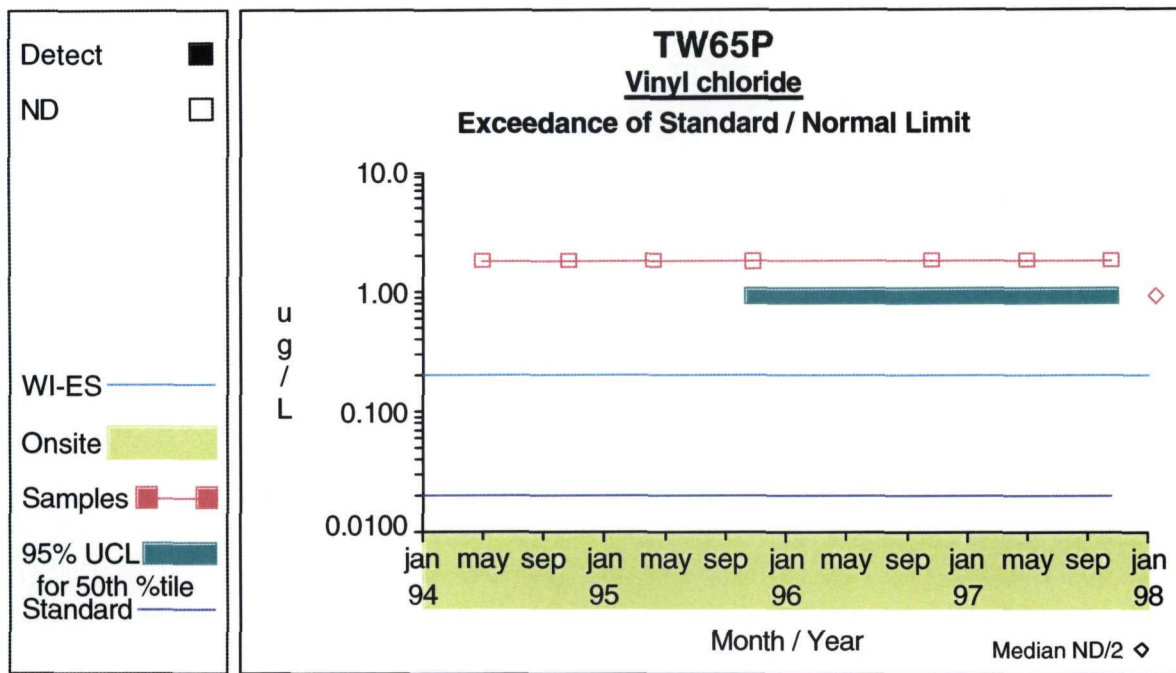
Comparison to Standard**Graph 542****Graph 543**

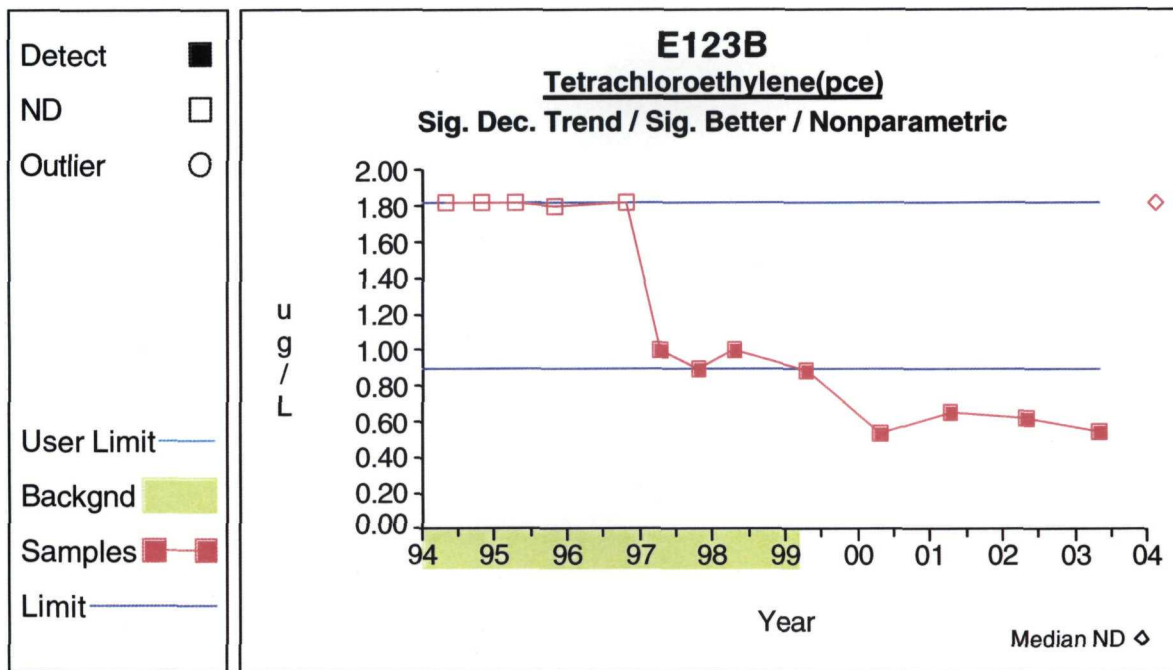
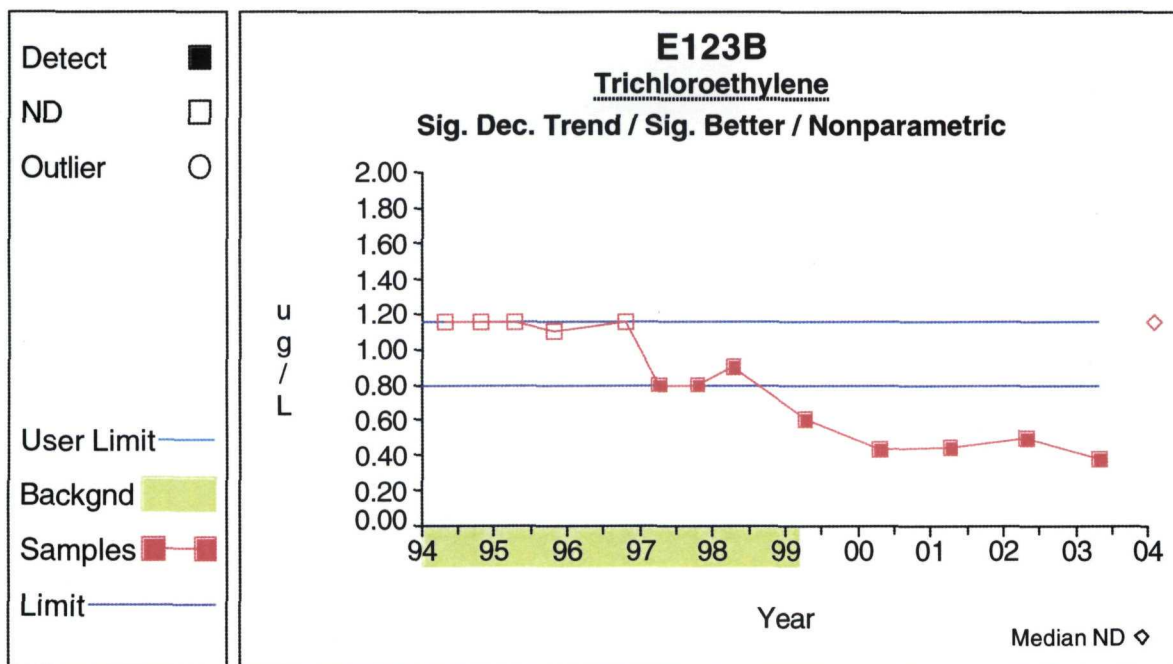
Comparison to Standard**Graph 548****Graph 549**

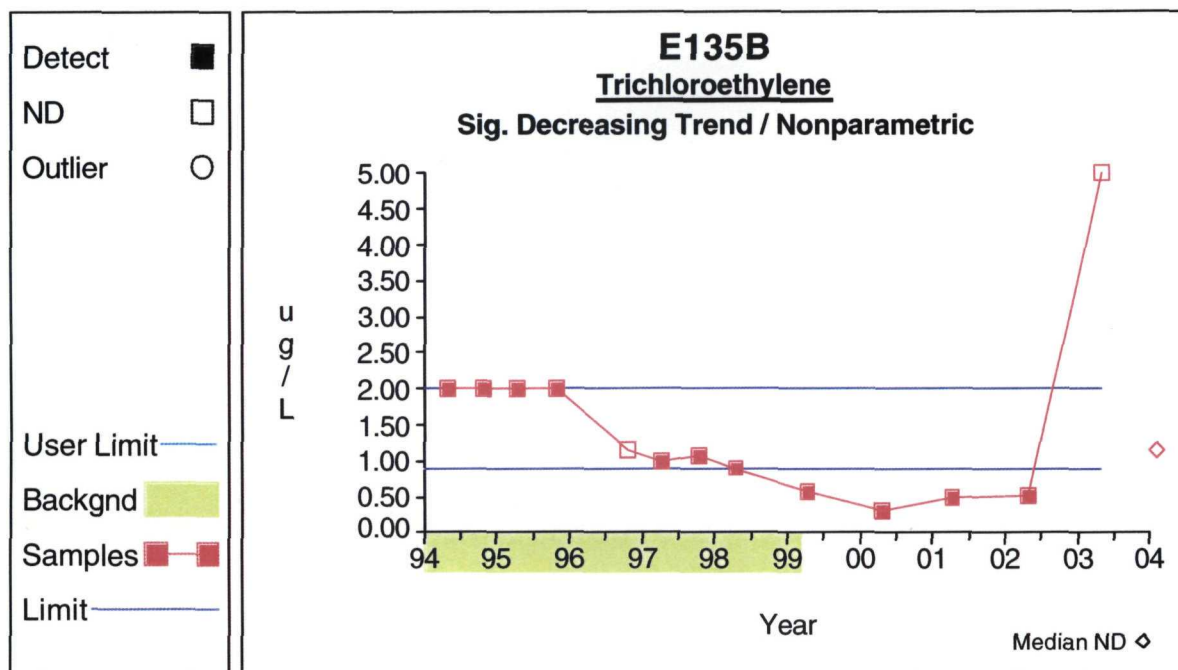
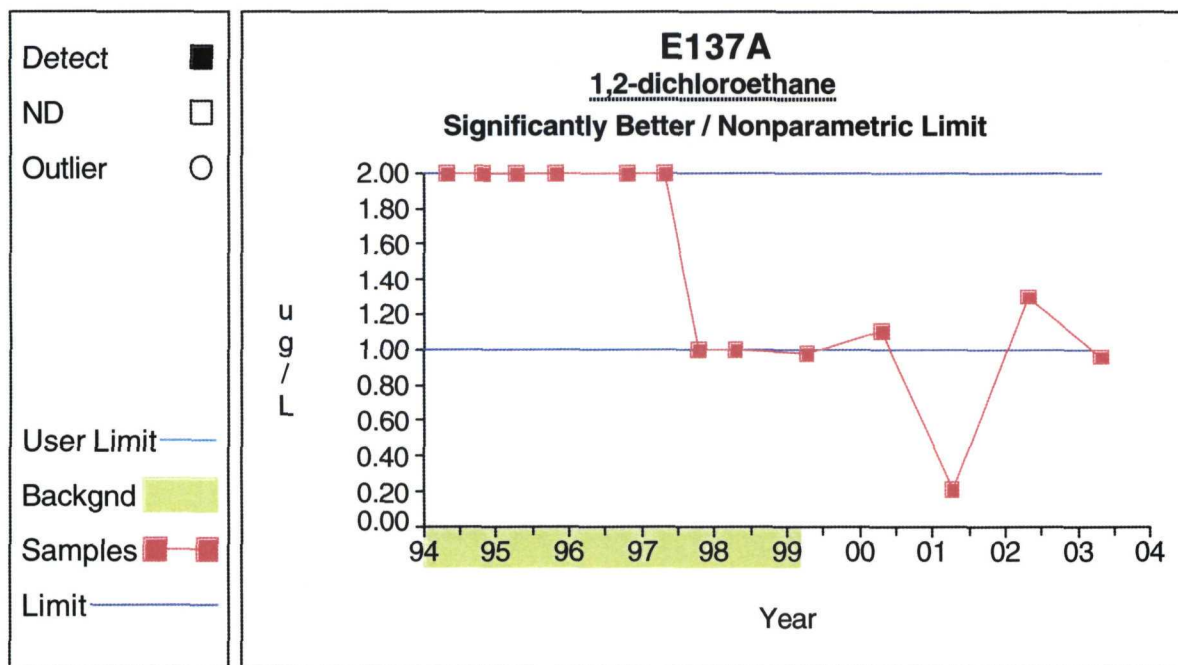
Comparison to Standard**Graph 550****Graph 551**

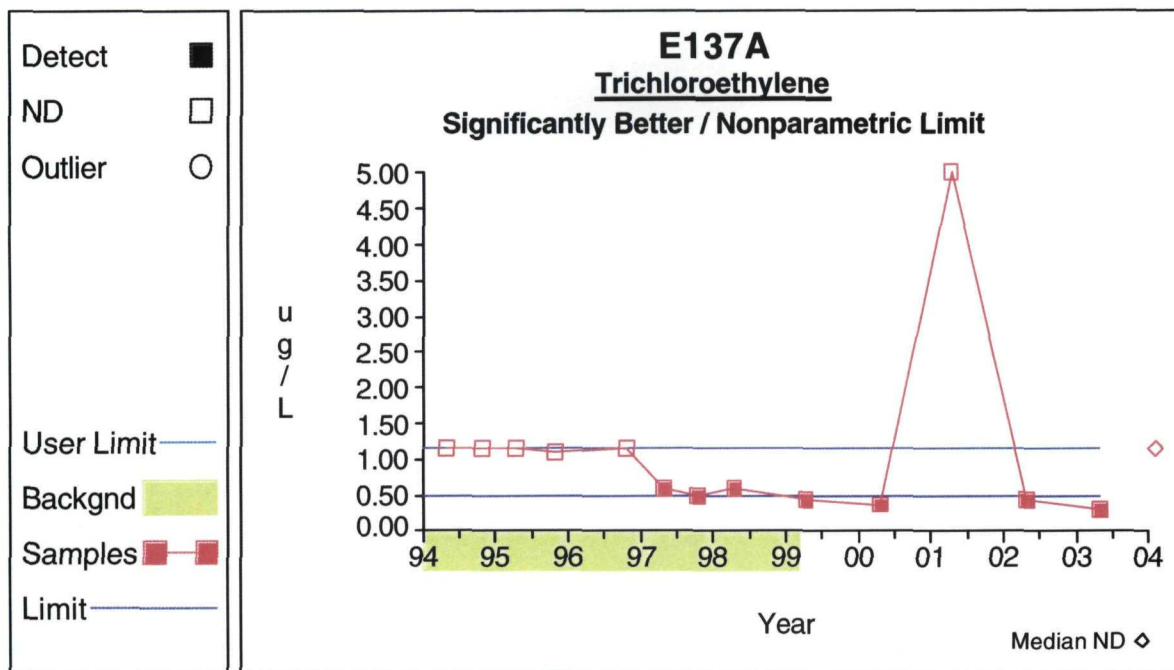
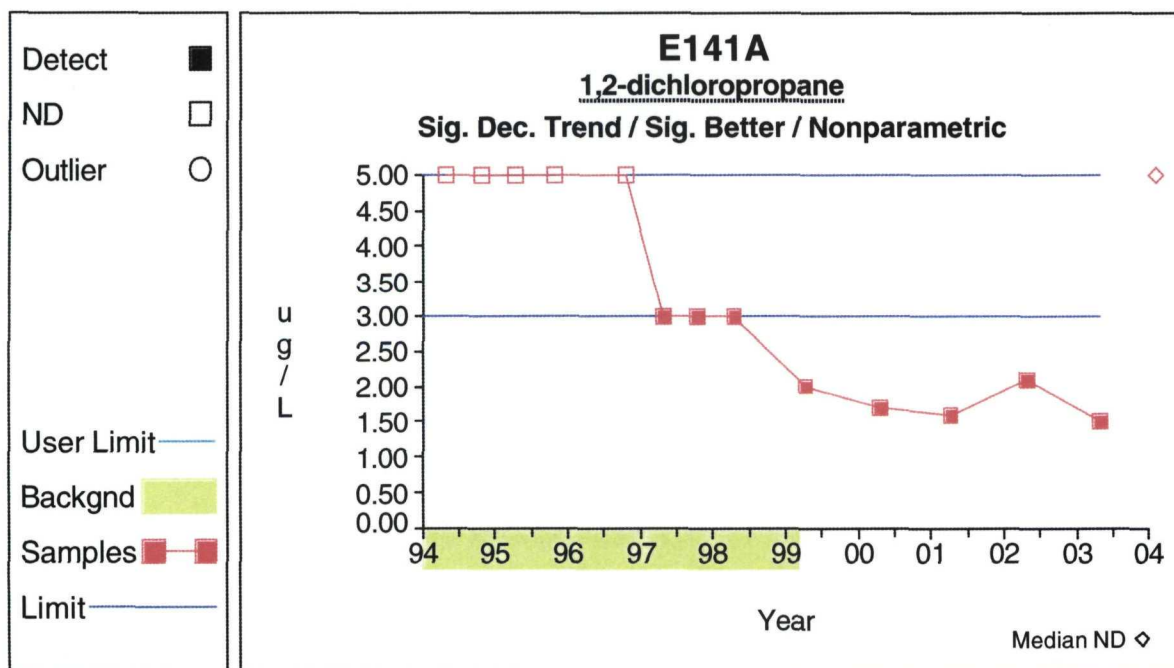
Comparison to Standard**Graph 552****Graph 553**

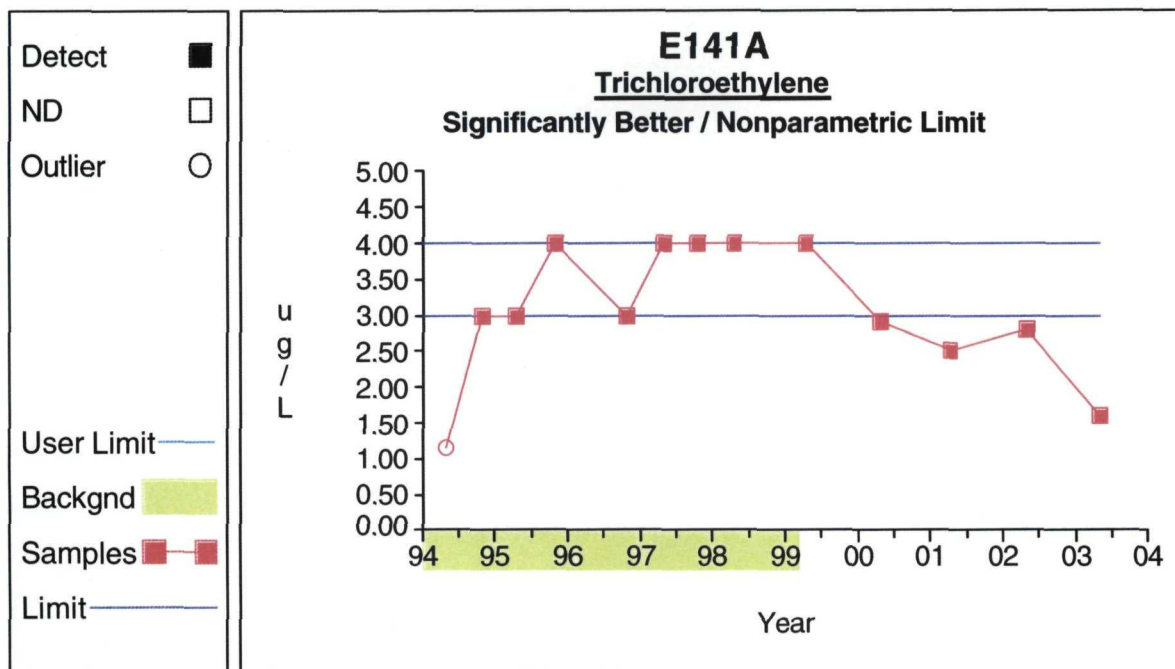
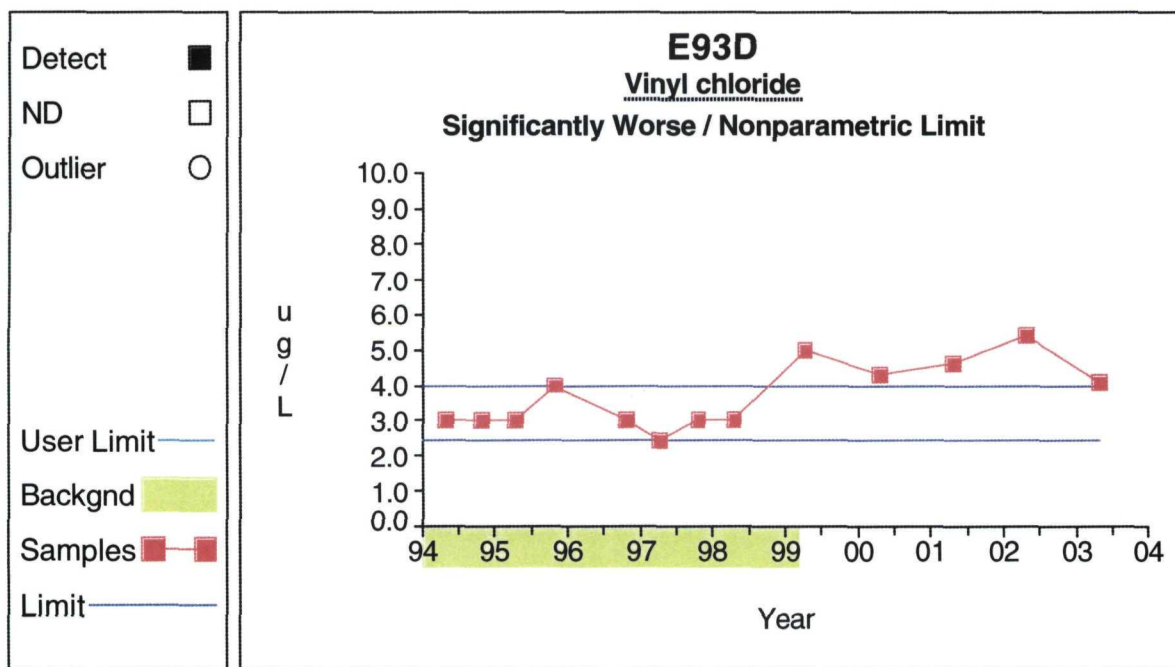
Comparison to Standard**Graph 558****Graph 559**

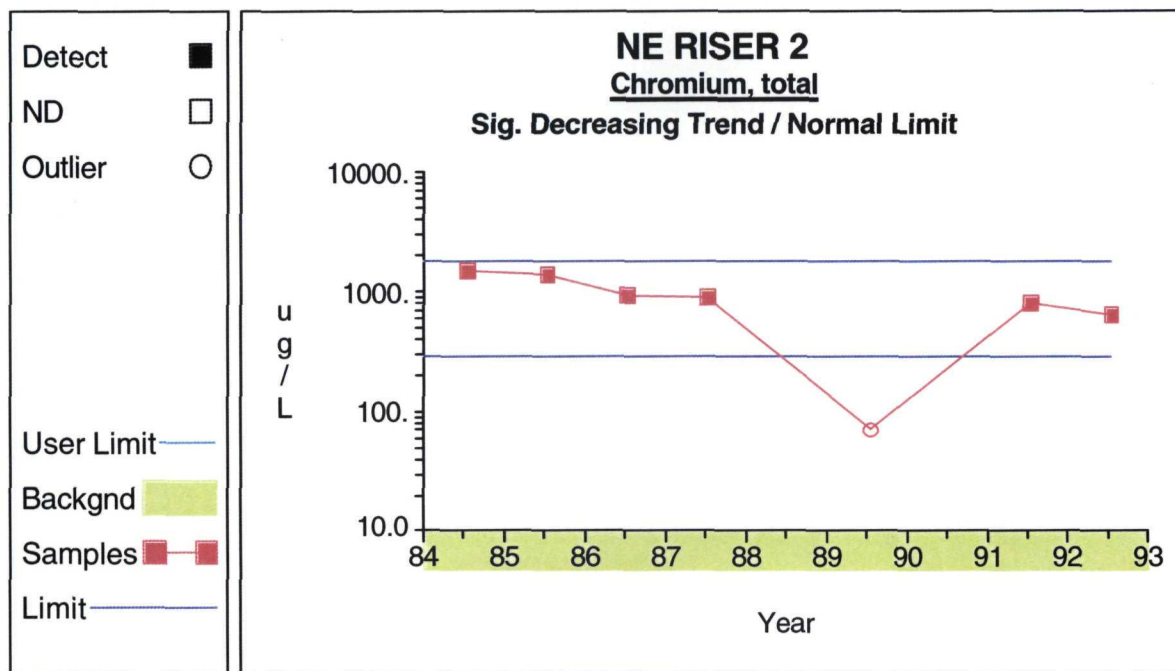
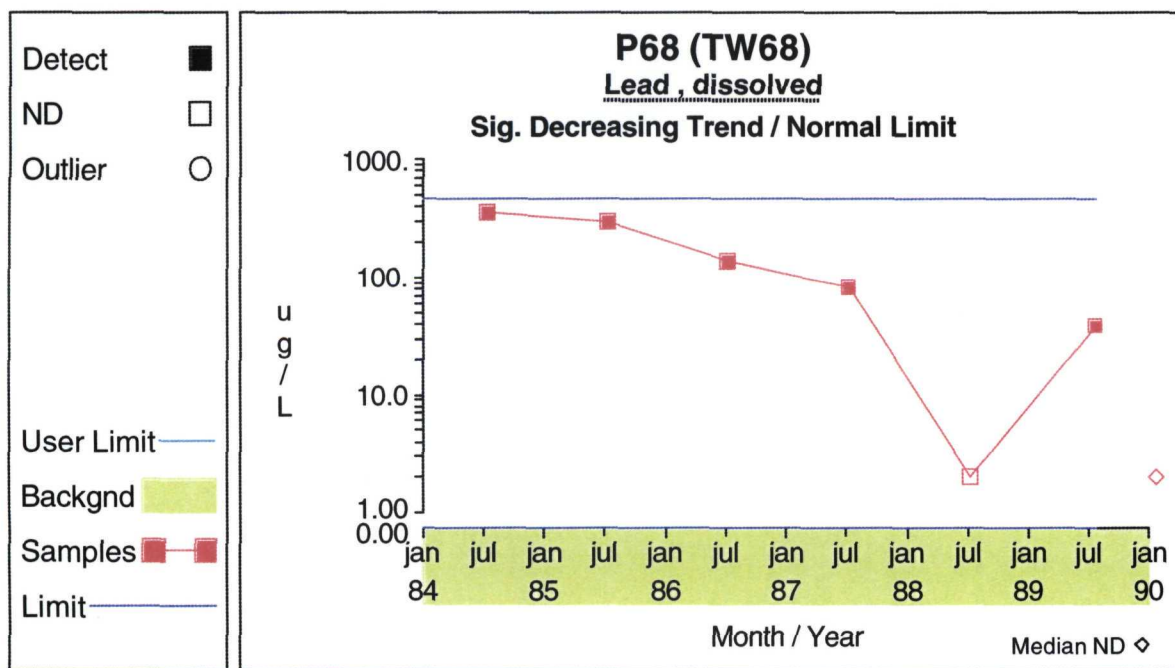
Comparison to Standard**Graph 560**

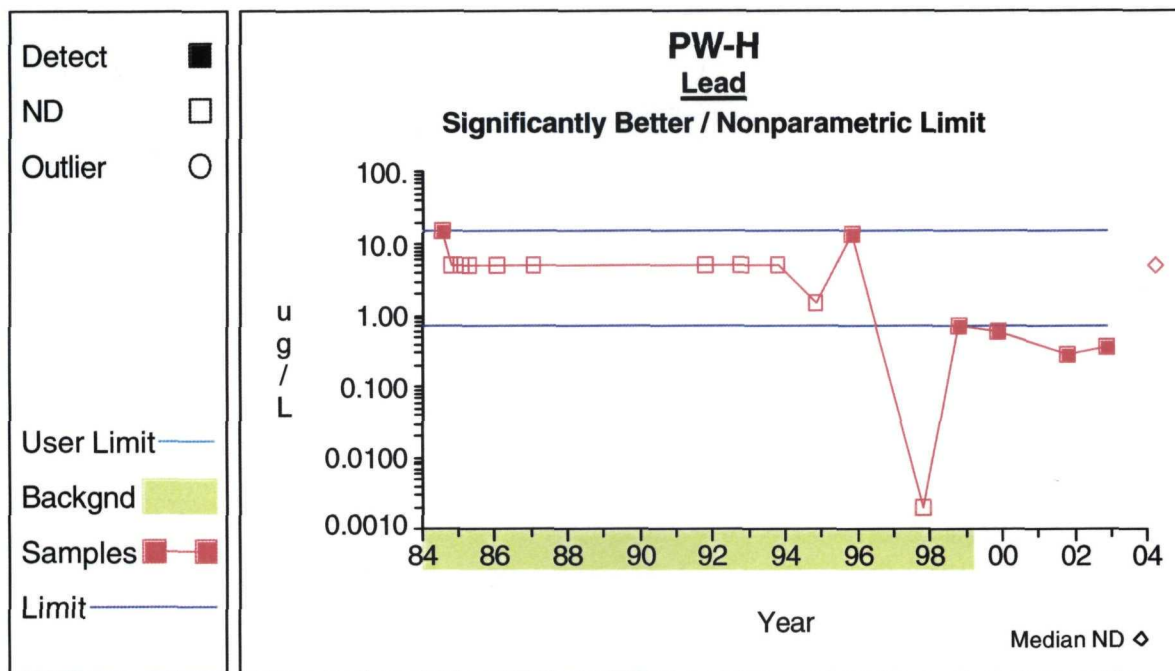
Natural Attenuation**Graph 48****Graph 49**

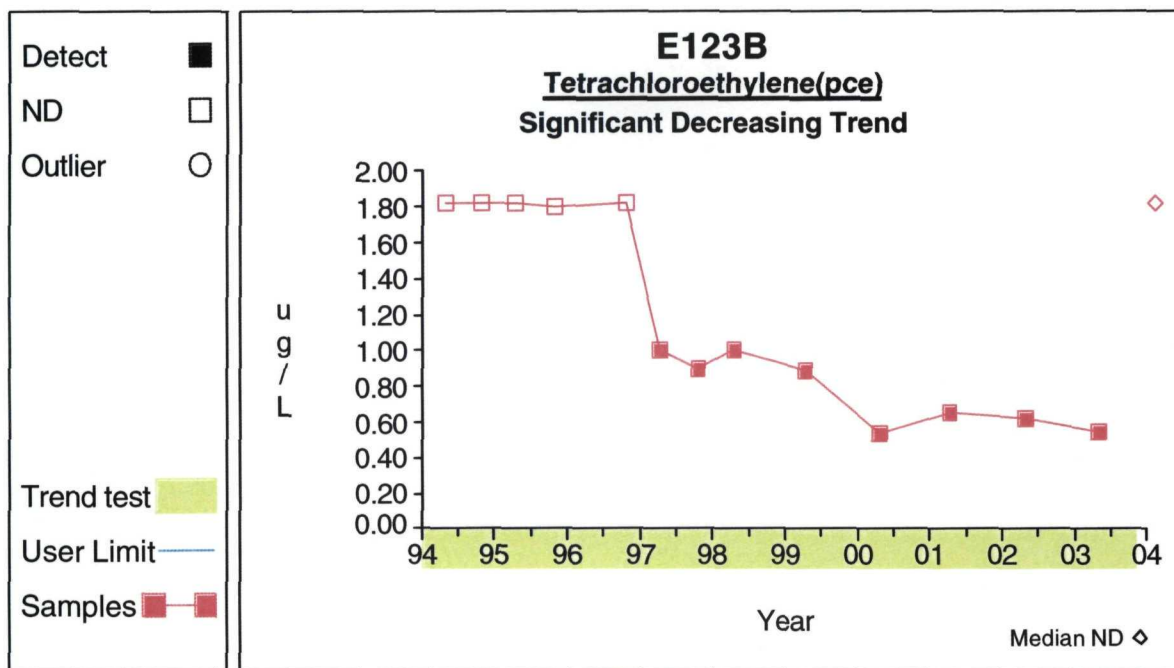
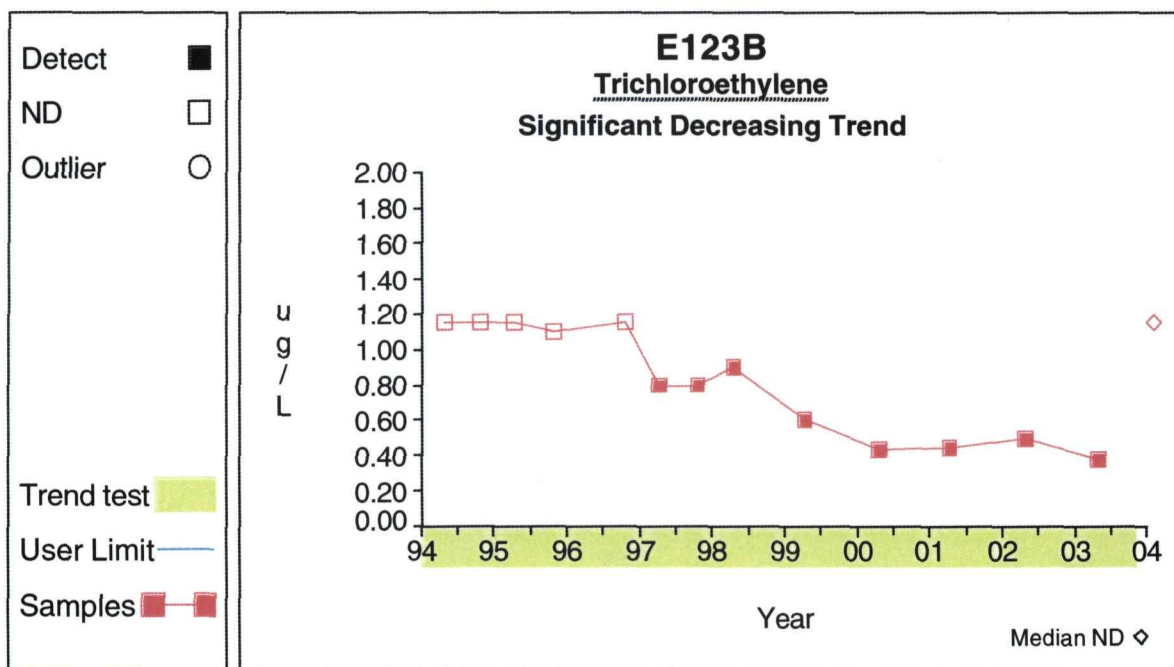
Natural Attenuation**Graph 69****Graph 71**

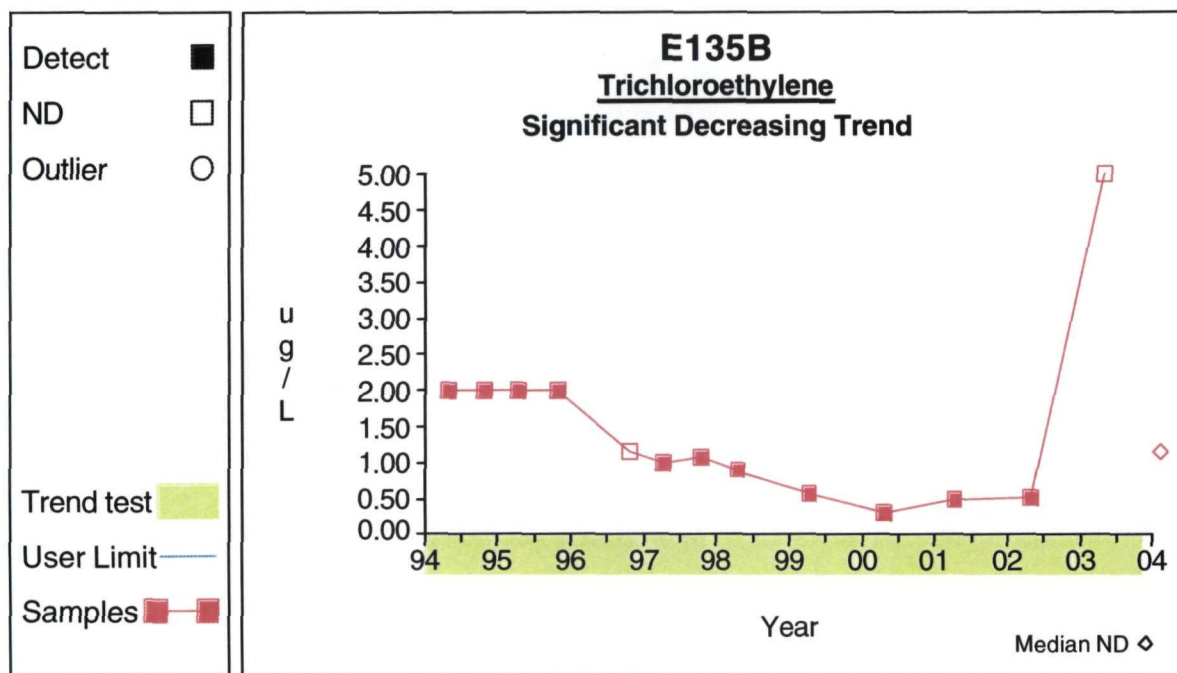
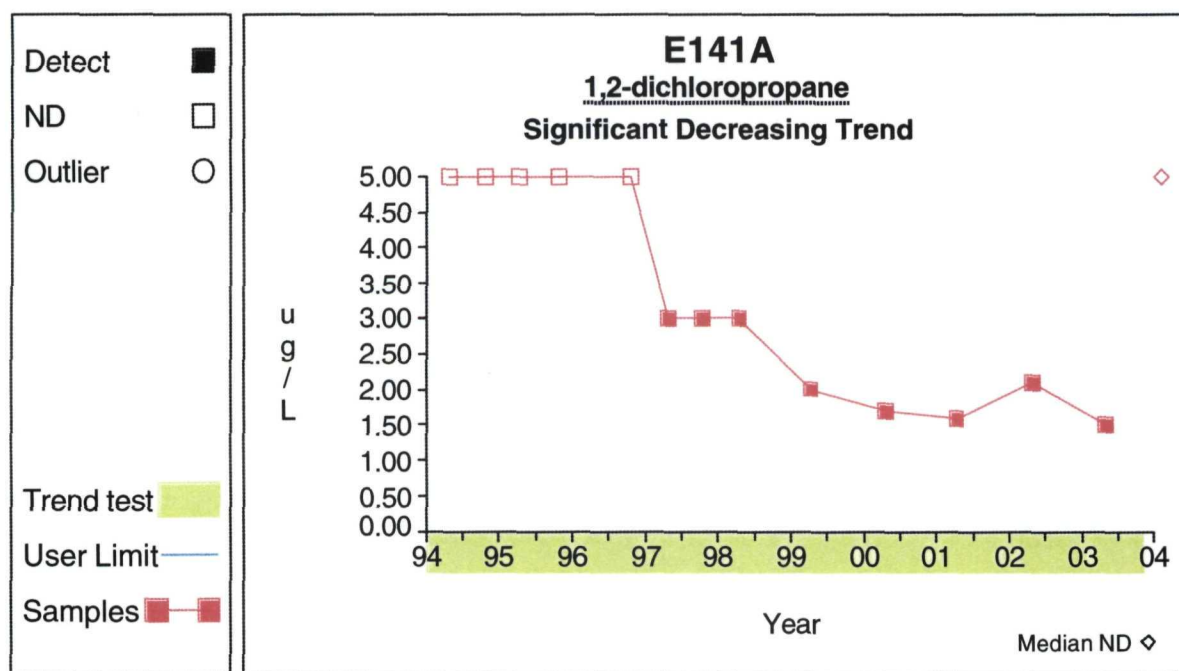
Natural Attenuation**Graph 79****Graph 102**

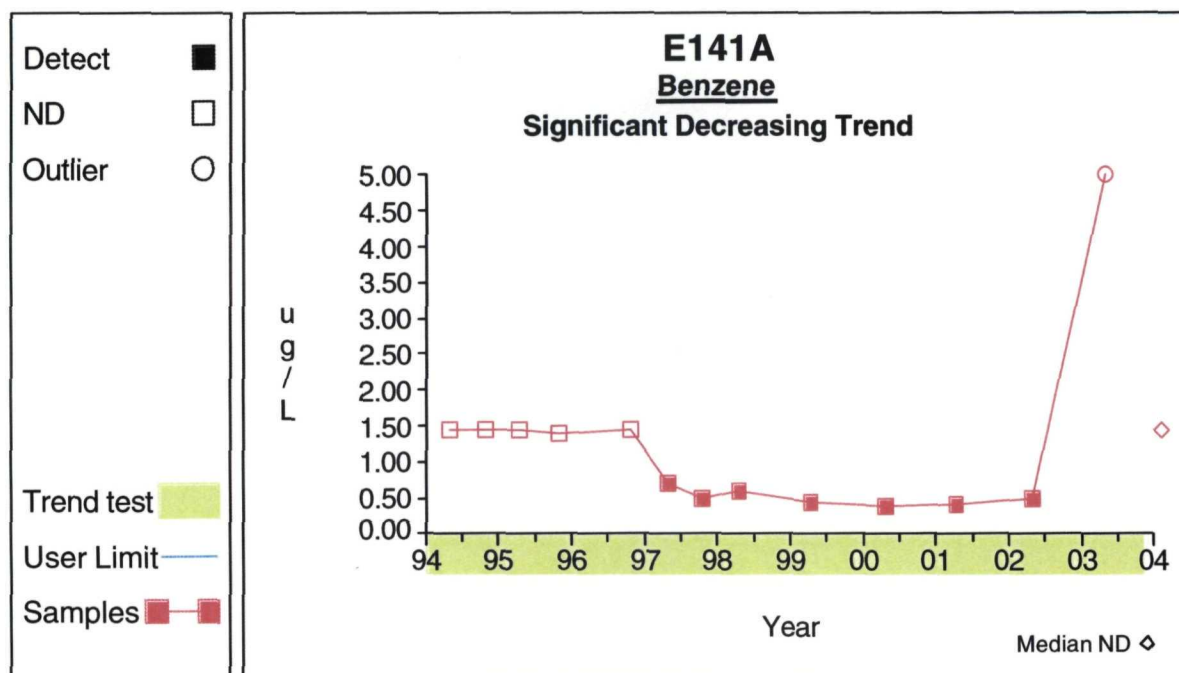
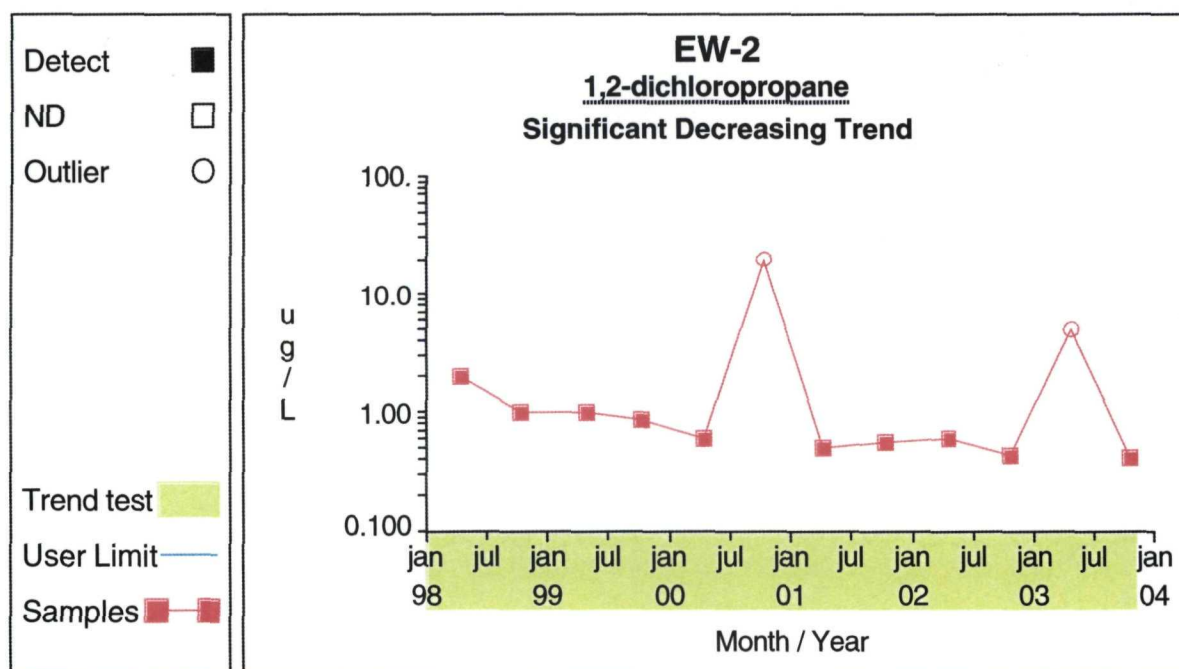
Natural Attenuation**Graph 109****Graph 260**

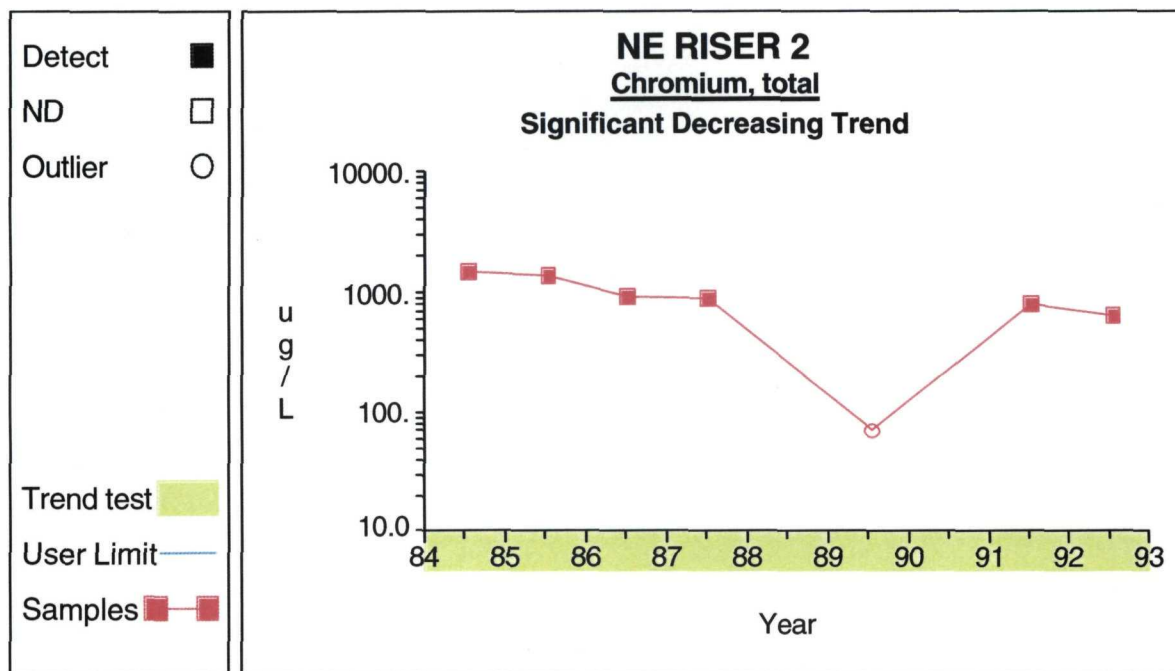
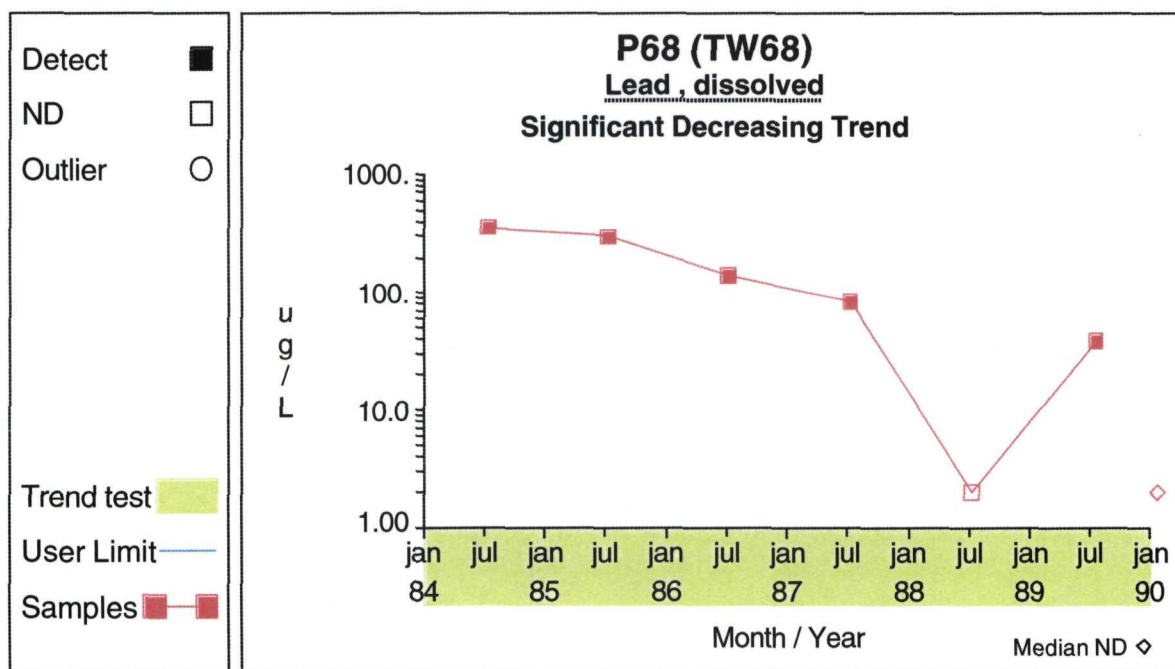
Natural Attenuation**Graph 444****Graph 527**

Natural Attenuation**Graph 606**

Time Series**Graph 48****Graph 49**

Time Series**Graph 69****Graph 102**

Time Series**Graph 103****Graph 322**

Time Series**Graph 444****Graph 527**

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 15

**PUBLIC NOTICE ISSUED BY U.S. EPA REGARDING OFFSITE
GROUNDWATER CONTAMINATION**



Crews to Extend Water Lines to Properties Impacted by Ground-Water Contamination

Muskego, Wisconsin

October 1999

This fact sheet summarizes plans for the extension of water lines to properties where private drinking water wells are contaminated, or threatened to be contaminated, with a chemical called vinyl chloride. The affected properties lie in the vicinity of Hillendale Drive and Janesville Road in Muskego.

What recent concerns have arisen regarding the ground water in the area?

Beginning in June 1997, workers sampling water supply wells found vinyl chloride in five private wells used for drinking and two wells used for outdoor activities (i.e., lawn sprinkling, water for animals.) U.S. EPA is concerned about the levels of vinyl chloride because levels exceed established State standards (0.2 parts per billion or ppb) for drinking water consumption and some levels exceed Federal standards (2.0 ppb). Levels of vinyl chloride found in the wells range from 0.2 to 2.8 or ppb. U.S. EPA has established a Removal Action Level of 1.8 ppb for vinyl chloride. When this level is found in drinking water, U.S. EPA requires that an alternate source of clean, safe drinking water be provided.

Following the detections, the potentially responsible party group (PRP Group)¹ provided bottled drinking water to affected property owners. To further limit residents' exposure to vinyl chloride, the PRP Group offered to provide and install whole house water treatment systems on homes with wells found to be contaminated. Most property owners with private wells containing vinyl chloride declined the offer of a treatment system.

What is vinyl chloride?

Vinyl chloride is a colorless gas that evaporates very quickly. It is used to make polyvinyl chloride (PVC) pipes, wire coatings, automobile upholstery, and plastic kitchenware. Vinyl chloride can also be formed in the environment when soil organisms break down chemicals known as chlorinated solvents.

Exposure to vinyl chloride through contaminated drinking water or other sources can *slightly* increase a person's risk of developing cancer. Drinking water for a period of 70 years which contains vinyl chloride at a concentration of 0.2 ppb presents a theoretical risk of 1 additional cancer death in 100,000 people than might otherwise be expected. As a protective measure, well owners are advised to seek an alternate source of water whenever vinyl chloride is found at a level above State and Federal drinking water standards.

Exposures of concern may occur if water from a contaminated well is used in routine household tasks such as bathing or showering, laundry, or washing dishes. Use of contaminated water for these purposes may cause vinyl chloride to evaporate into the air in the home, resulting in exposure through inhalation.

What is being done to address the contamination?

The appropriate response for property owners whose drinking water wells contain vinyl chloride is to abandon the water supply well and connect that property to the city water supply system.

As such, the PRP Group has offered selected property owners in the vicinity of Hillendale Drive and Janesville Road the opportunity to connect to a new city water main soon to be installed. These properties have wells that are contaminated with vinyl chloride or are at risk for contamination because of their proximity to contaminated wells.

Will existing wells be closed or "abandoned?"

In addition to connecting properties to city water mains, the PRP Group has also offered to properly close or abandon selected existing wells that will not be used for future ground water monitoring. Well abandonment involves removing the pump, cutting the well casing down to below grade, filling the casing with Wisconsin Department of Natural Resources (DNR)-approved material such as bentonite clay or neat cement grout, and placing top soil or other clean fill to the level of the surrounding ground surface. Proper well abandonment ensures that surface contaminants and debris do not enter the ground water.

¹The PRP Group is a group of companies that are addressing ground water contamination at the Muskego Sanitary Landfill, located northwest of the affected properties.

Some homes in this area are already connected to existing city water mains, but use a private well for purposes other than drinking (i.e., lawn watering, drinking water for animals). The PRP Group will offer to abandon selected private wells.

When will city water lines be extended?

The extension of water mains will begin around November 1, 1999. Water main extension is expected to be completed by December 1. Once the water mains have been installed and tested, workers will begin to connect lateral water lines to individual properties. U.S. EPA anticipates that this work will be completed by the end of the year.

Who is providing the water mains, hook-ups, and well abandonment?

The City of Muskego will administer the installation of water mains. The PRP Group will coordinate the connection of individual properties in the impacted area to the water main, and abandon the private wells.

Will I be able to keep my existing well?

To reduce the risk of exposure to contaminated water, U.S. EPA and State agencies recommend that all wells contaminated with vinyl chloride be abandoned.

What if I don't want city water?

Although property owners offered city water by the PRP Group may reject the offer if they so choose, U.S. EPA, DNR, and Wisconsin Department of Health and Family Services strongly encourage homeowners to accept the Group's offer. If a property owner elects not to connect to the system at this time, subsequent connection will be at the owner's expense.

I am concerned my private well may be contaminated. How can I find out?

The PRP Group is monitoring selected private wells considered most likely to be impacted by the vinyl chloride in order to track the movement of the ground water contamination. If your well is not one of these, and if you have not been contacted for well monitoring by the PRP Group or State or Federal agency representatives, you must arrange and pay for sampling yourself. You may contact Nancy Payne, DNR Drinking Water Supply Specialist, at (414) 229-0827 for a list of State-certified laboratories. To identify vinyl chloride, you should ask the laboratory to conduct a volatile organic chemical analysis.

What if contamination spreads beyond the area currently being connected to city water?

Under U.S. EPA and DNR oversight, the PRP Group will continue to monitor selected private water well supplies to assess what additional steps should be taken to ensure additional wells are not impacted.

My water is supplied by the City of Muskego. Is that water safe?

Tests from the closest city well did not find ground water contamination. The Federal Safe Drinking Water Act requires contaminant monitoring of all city wells. For information about the quality of Muskego municipal water, contact Scott Kloskowski, Superintendent, Muskego Water Utility, at (414) 679-4128.

Questions?

Contact any of the following individuals below:

U.S. EPA

Bri Bill, Community Involvement Coordinator

1-800-621-8431 x 36646

Laura Evans, Remedial Project Manager

1-800-621-8431 x 60851

Wisconsin DNR

Jim Delwiche, Hydrogeologist

(414) 229-0846

Nancy Payne, Drinking Water Specialist

(414) 229-0827

Sharon Schaver, Regional Geologist

(414) 263-8560

PRP Group

Larry Buechel, Project Coordinator

Waste Management, Inc.

(414) 253-8626 x 123

City of Muskego (regarding construction work or quality of Muskego municipal water)

Scott Kloskowski, Superintendent

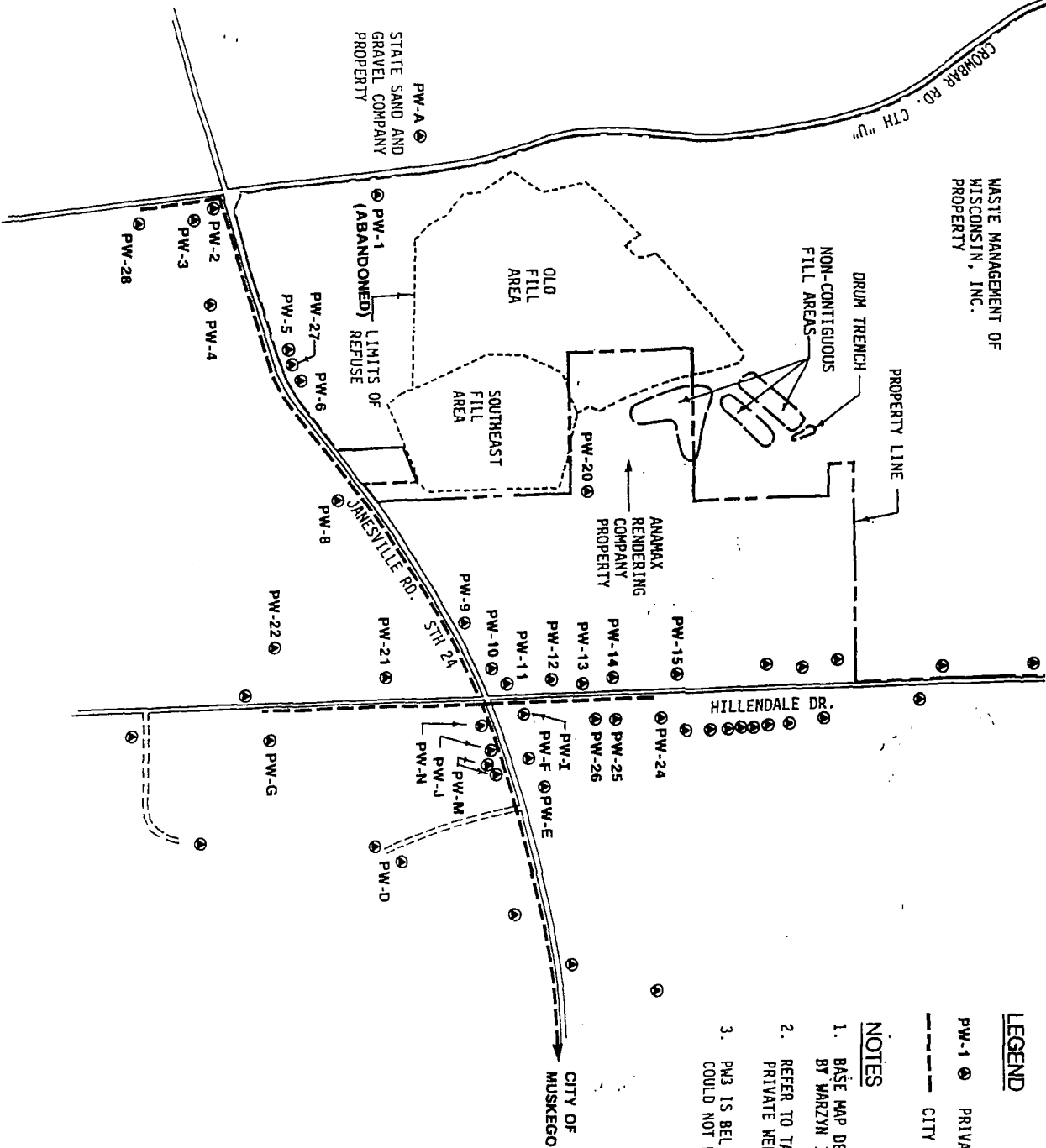
Muskego Water Utility

(414) 679-4128

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 16

**MAPS DEPICTING PRIVATE/RESIDENT WELLS
AND EXISTING AND FORMER PRIVATE WELL IDENTIFIER
CONCENTRATIONS ON SITE**



LEGEND

- PW-1 Private Well/Resident Location and Number
- City of Muskego Public Water System

NOTES

1. BASE MAP DEVELOPED FROM DRAWING 13527-7 PREPARED BY WARZYN INC., DATED APRIL 1989.
2. REFER TO TABLE 12 OF THE TEXT FOR STATUS OF PRIVATE WELLS AND RESIDENT ADDRESSES.
3. PW-15 IS BELIEVED TO BE ABANDONED, BUT COULD NOT BE CONFIRMED.

0 600 1200
SCALE IN FEET

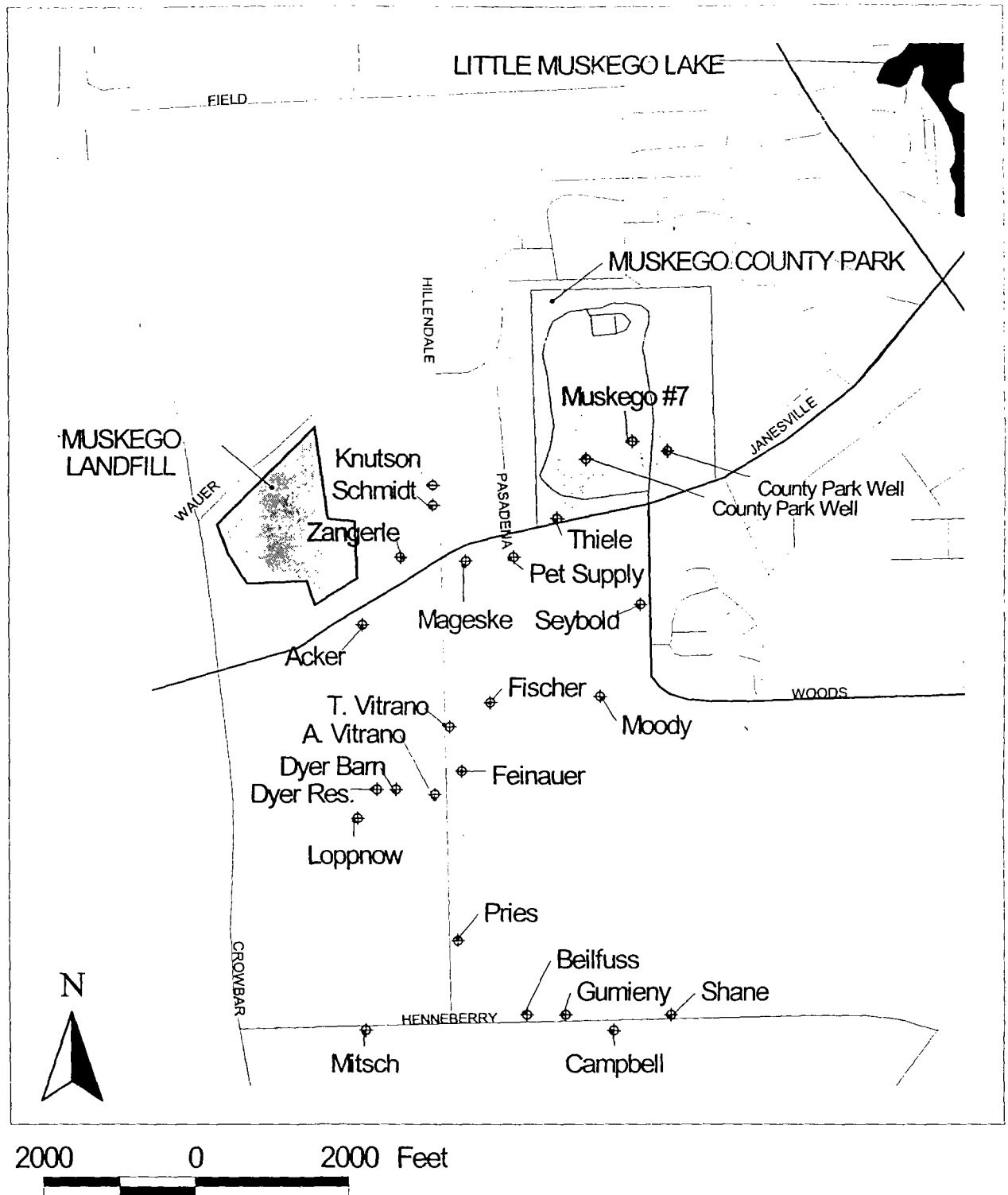
north

PRIVATE WELL/RESIDENT LOCATION MAP

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
MUSKEGO SANITARY LANDFILL
WASTE MANAGEMENT OF WISCONSIN, INC.
CITY OF MUSKEGO, WISCONSIN

WARZYN
WARZYN ENGINEERING INC.

Designed By: JCB
Drawn By: JCB
Approved By: KEB
Date: 1-1-89



LEGEND

⊕ Water Supply Well Location

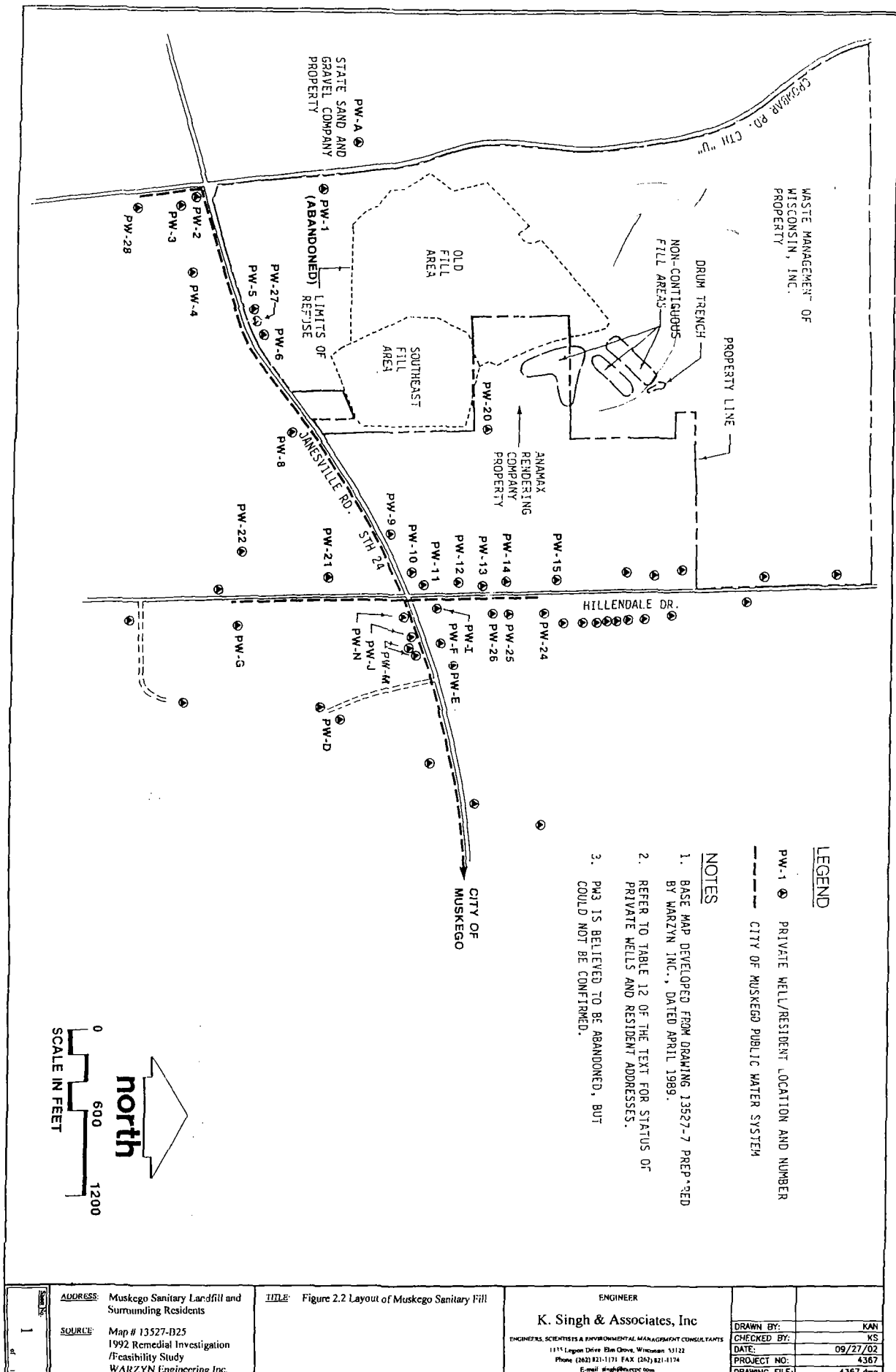
Figure 1.
Area Location Map.

MUSKEGO LANDFILL
EXPANDED GROUNDWATER MONITORING WORK PLAN
MUSKEGO, WISCONSIN

MONTGOMERY
WATSON

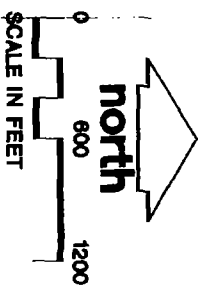
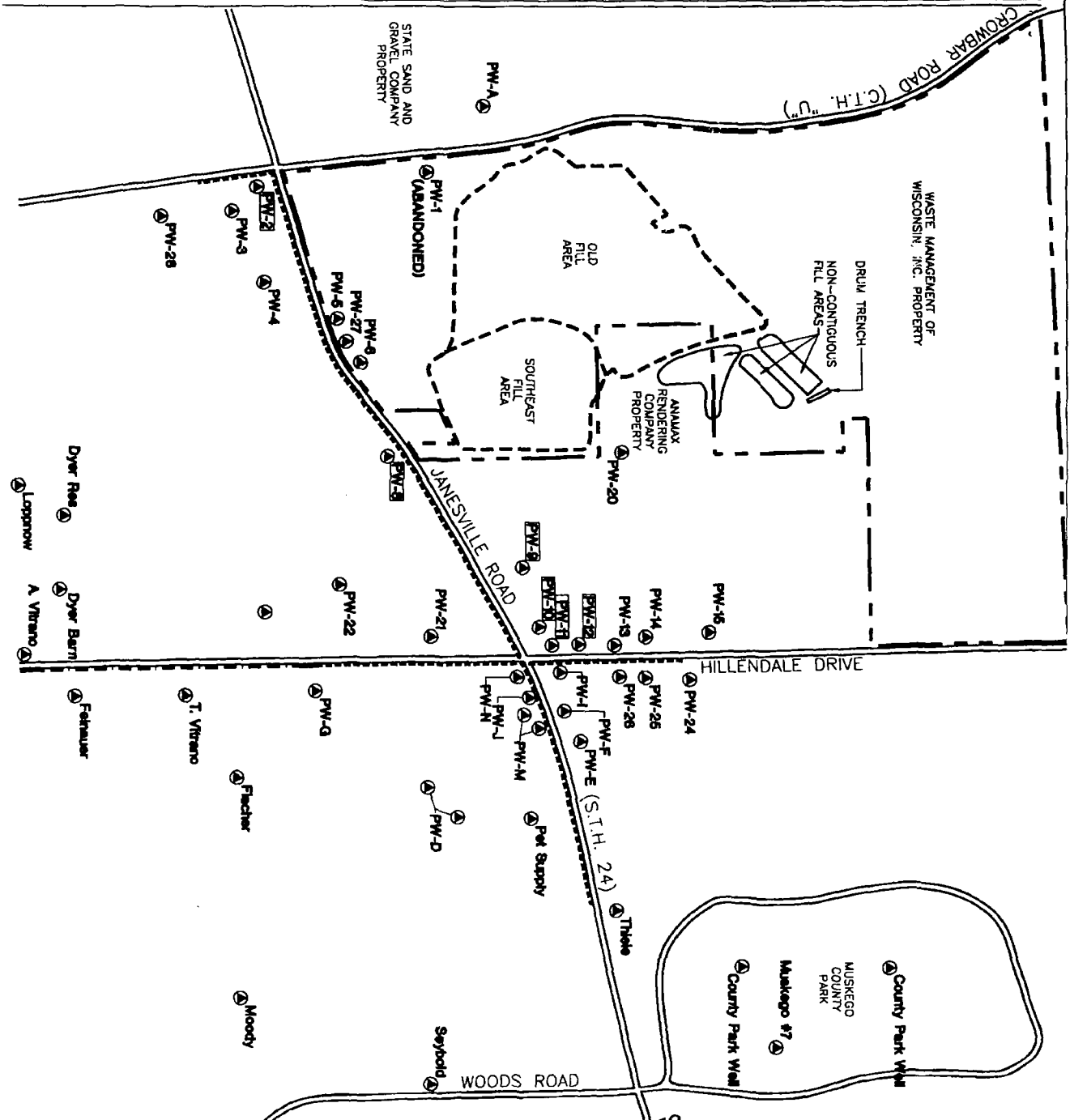


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This document has been developed for a specific application and may not be used without the written approval of Montgomery Watson Harris.

QUALITY CONTROL	Graphic Standards DLF	8-29-03	Technical Review	Project Manager KJO	8-29-03	Management Review	Other
	Lead Professional						



NOTES

1. BASE MAP DEVELOPED FROM DRAWING 13527-B25 PREPARED BY WARZYN INC., DATED JANUARY 13, 1992.
2. REFER TO TABLE 12 OF THE RI REPORT FOR STATUS OF PRIVATE WELLS AND RESIDENT ADDRESSES.
3. PW3 IS BELIEVED TO BE ABANDONED, BUT COULD NOT BE CONFIRMED.

LEGEND

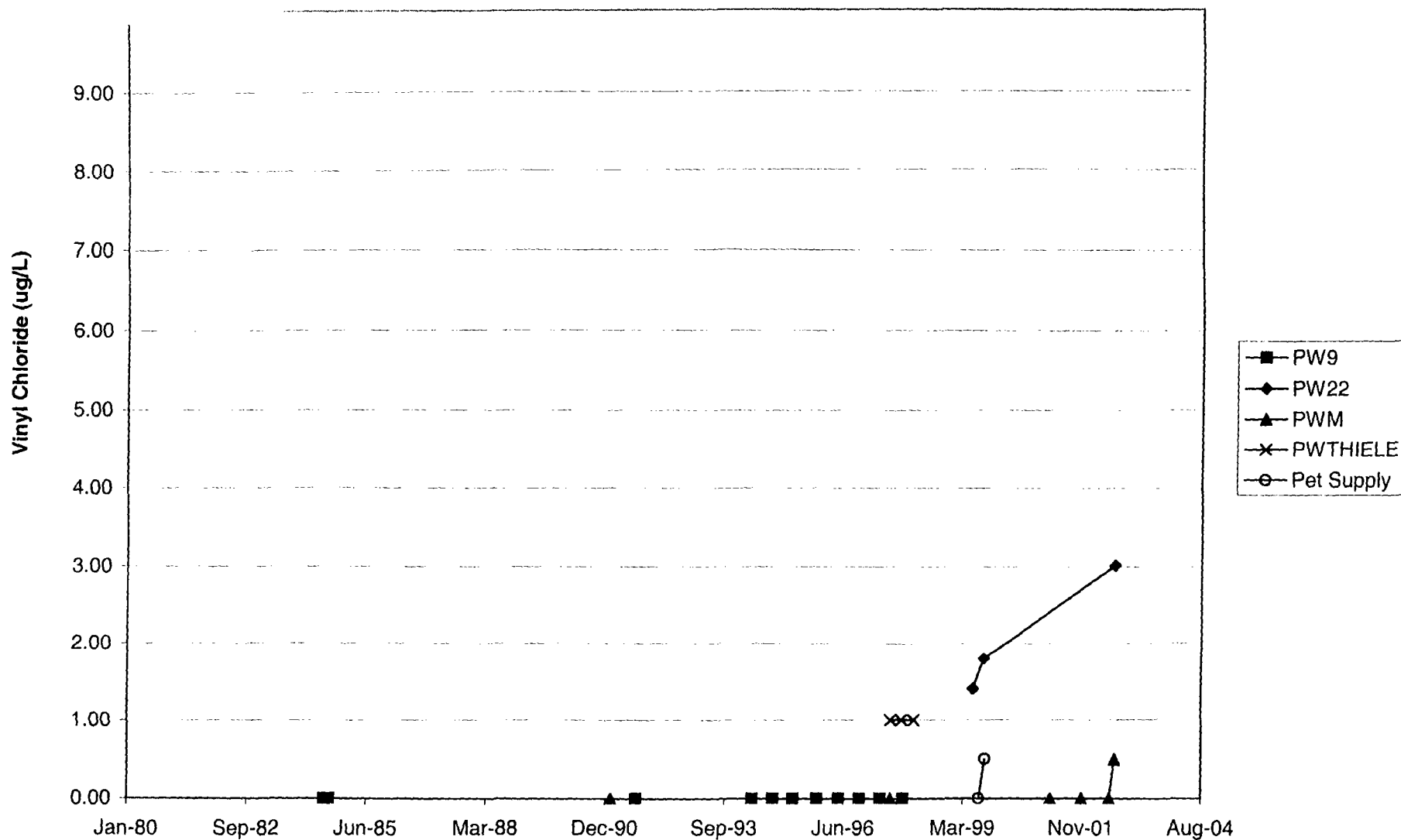
---	APPROXIMATE PROPERTY LINE
---	LIMITS OF REFUSE
---	CITY OF MUSKEGO PUBLIC WATER SYSTEM (1986)
---	CITY OF MUSKEGO PUBLIC WATER SYSTEM (2000)
○	PRIVATE WELL/RESIDENT LOCATION AND NUMBER
○	PRIVATE WELL/RESIDENT LOCATION AND NUMBER (8/91 EPA SAMPLING FOR RI)

	PRIVATE WELL RI SAMPLING MAP - 8/01 EXPERT REPORT MUSKEGO SANITARY LANDFILL WASTE MANAGEMENT OF WISCONSIN, INC. CITY OF MUSKEGO, WAUKESHA CO., WISCONSIN	Developed By KJO Approved By <i>Remond</i> Reference Revisions	Drawn By DLF Date 9-18-03	
	Drawing Number 2082532 01010101			
	B1			

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 17

GRAPHS DEPICTING CONTAMINANT TRENDS ON SITE

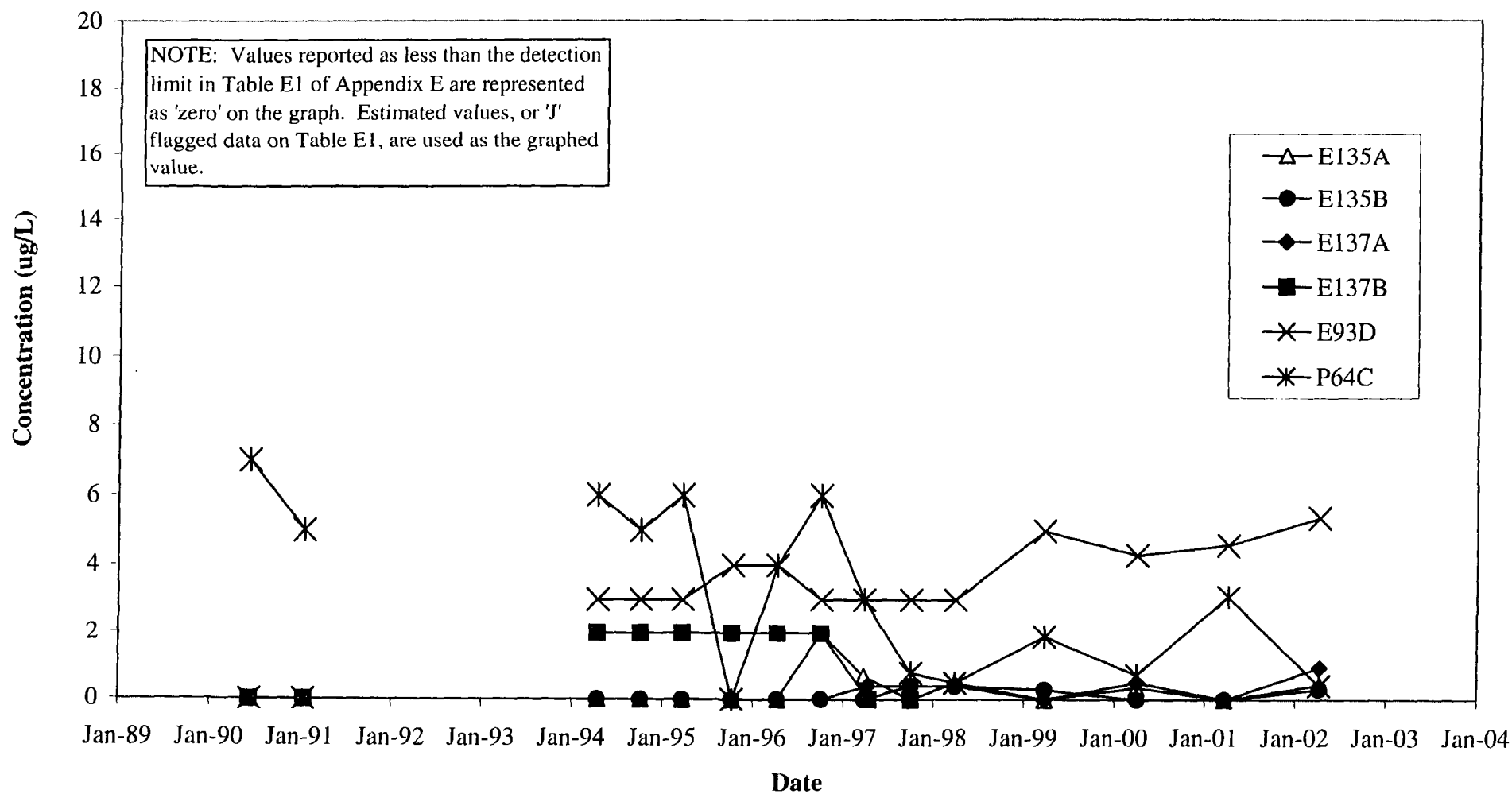


Note:

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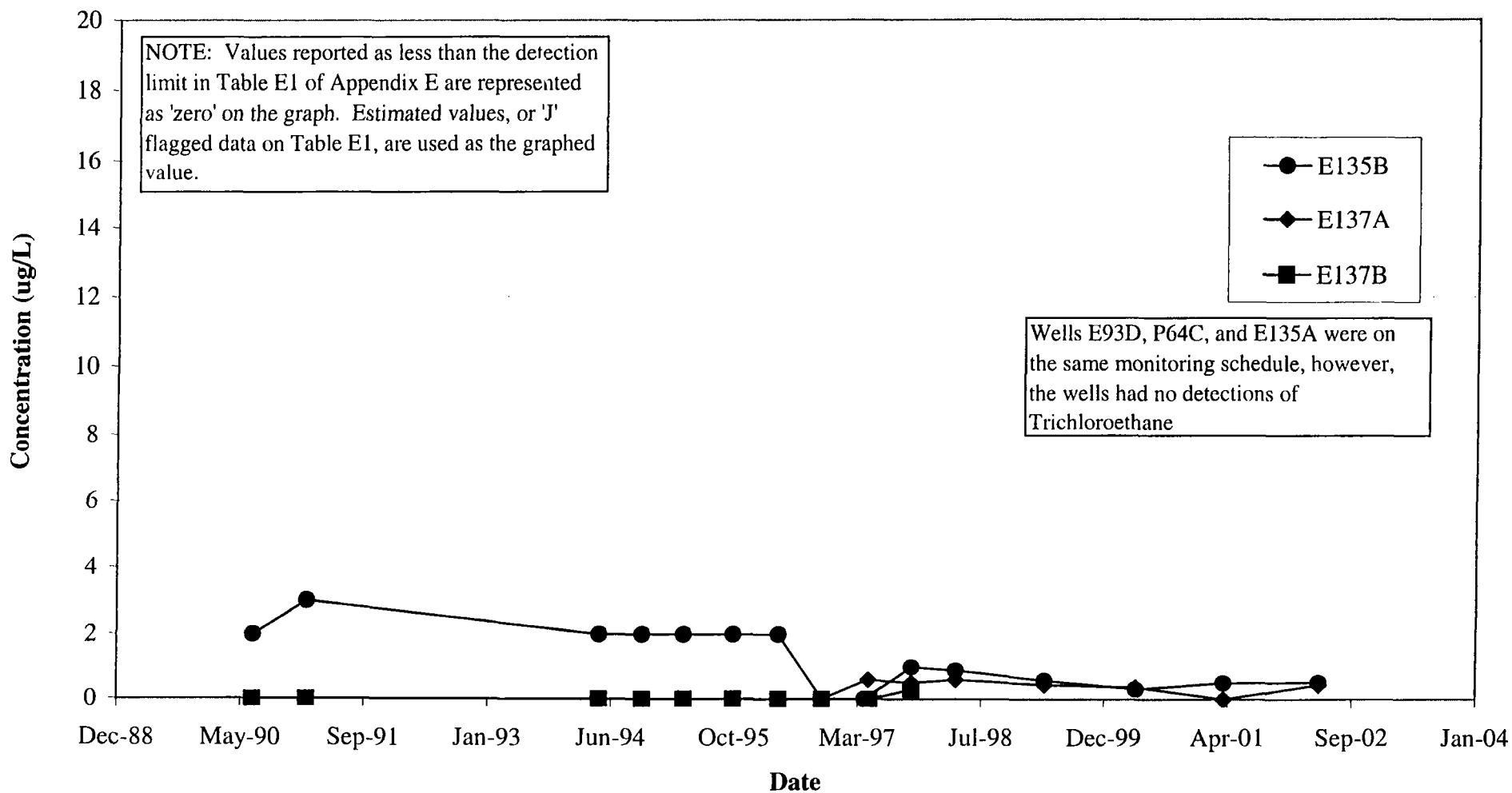
U:\208\2653\01\wp\tbl\expandedworkplanFigures.xls\Figure 3

Figure 3
Private Well Vinyl Chloride
Southeast Flowpath
Muskego Sanitary Landfill



Note:
Non-detect values are graphed as "0"

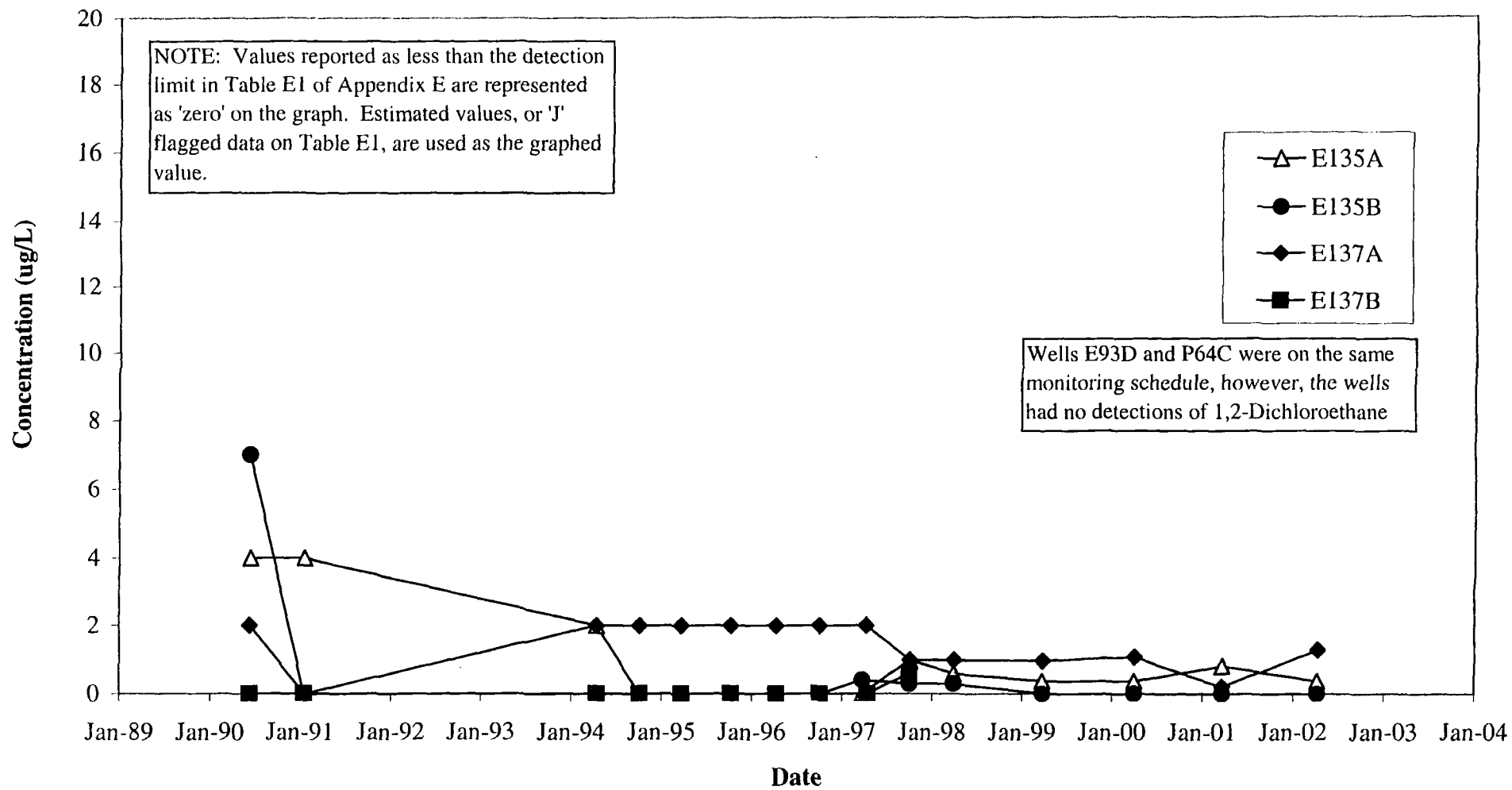
Figure 4
Trend in Vinyl Chloride Concentrations
Muskego Sanitary Landfill



Note:
Non-detect values are graphed as "0"

N:\Jobs\208\2653\01\wp\tbl\expandedworkplanFigures.xls\Figure 5

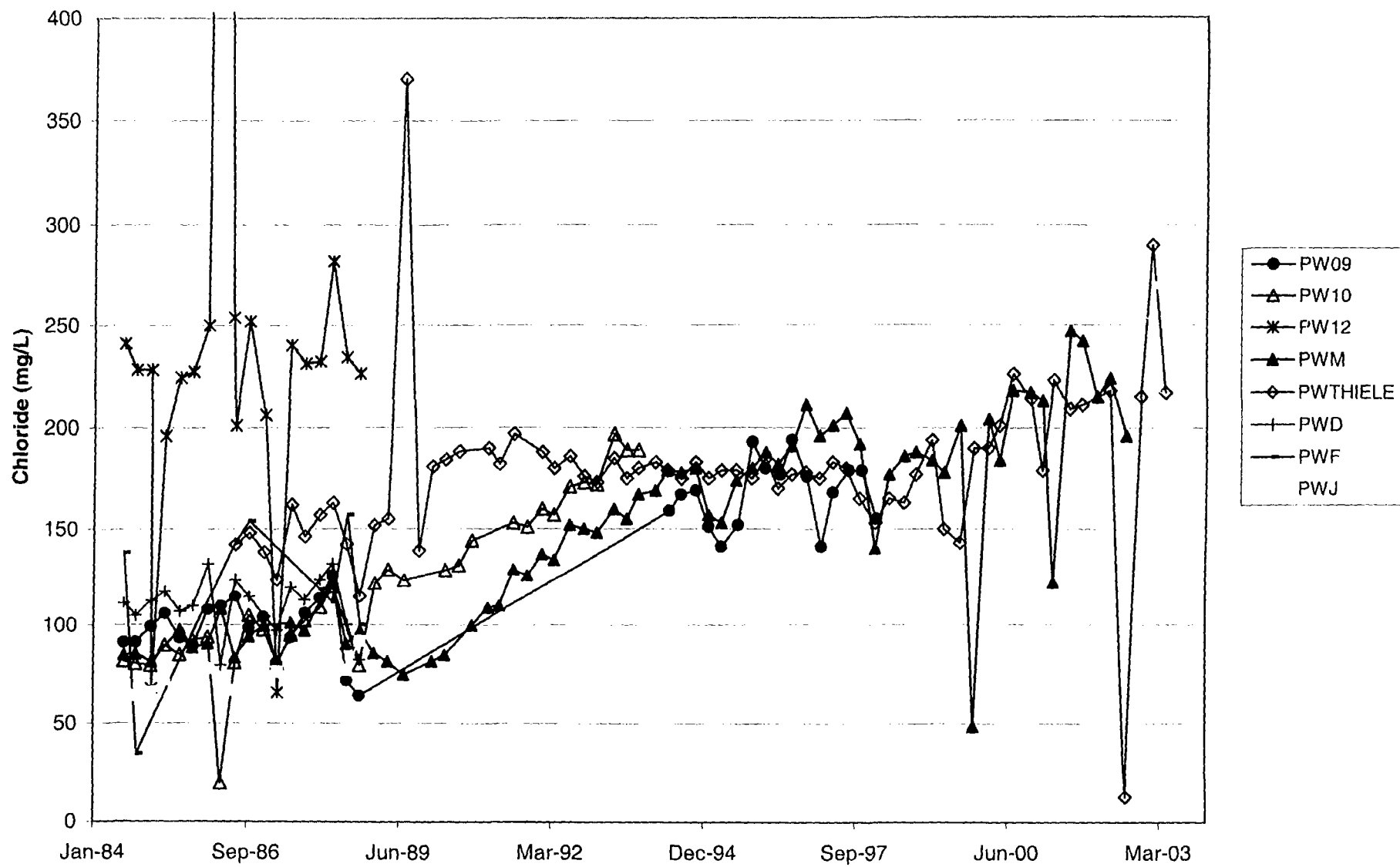
Figure 5
Trend in Trichloroethene Concentrations
Muskego Sanitary Landfill



Note:
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N:\Jobs\208\2653\01\wp\tbl\expandedworkplanFigures.xls\Figure 6

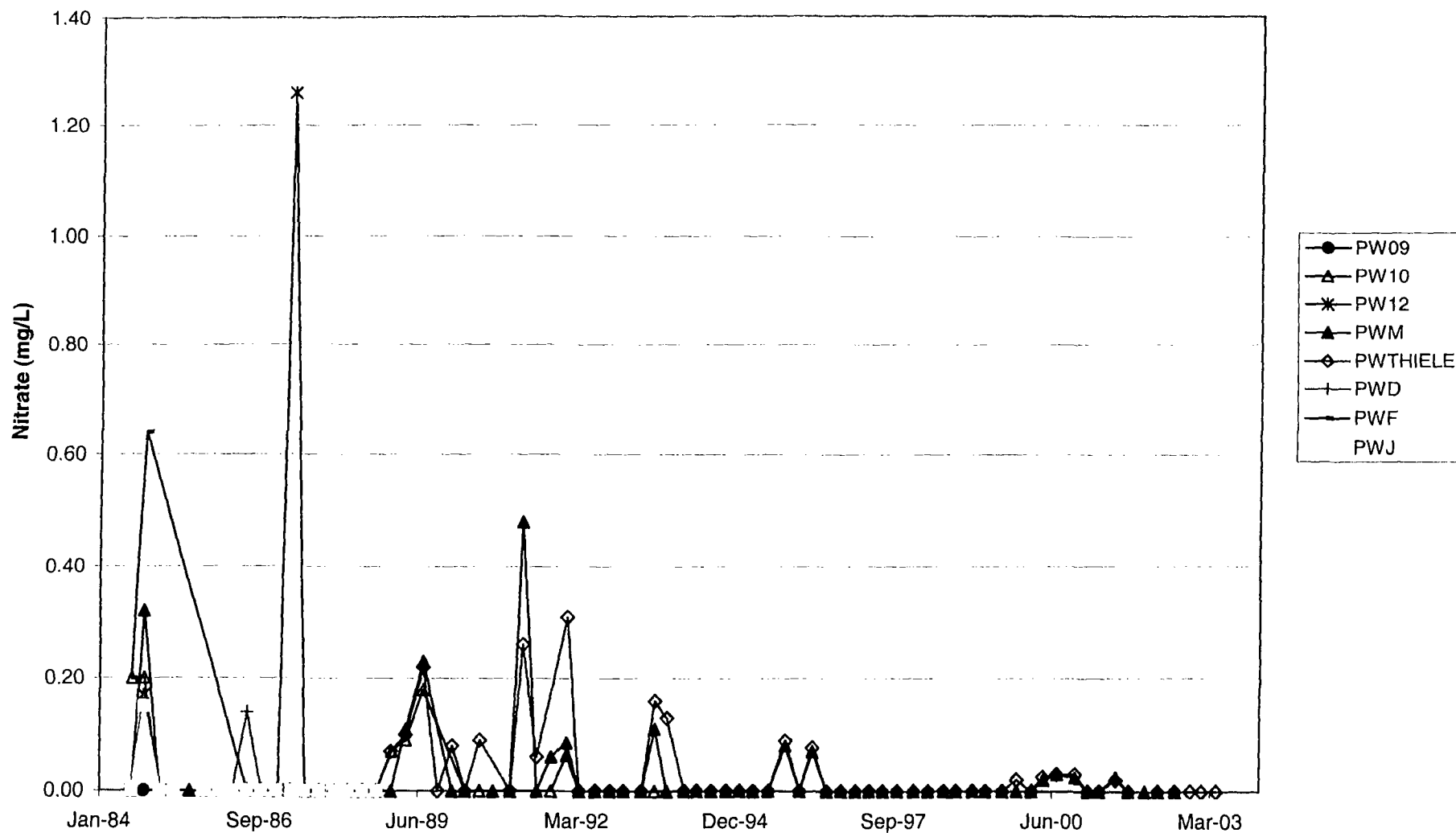
Figure 6
Trend in 1,2-Dichloroethane Concentrations
Muskego Sanitary Land



Note:
Non-detect values are graphed as "0"

N:\Jobs\208\2653\01\wp\tbl\expandedworkplanFigures.xls\Figure 7

Figure 7
Private Well Chloride
Southeast Flow Path
Muskego Sanitary Landfill



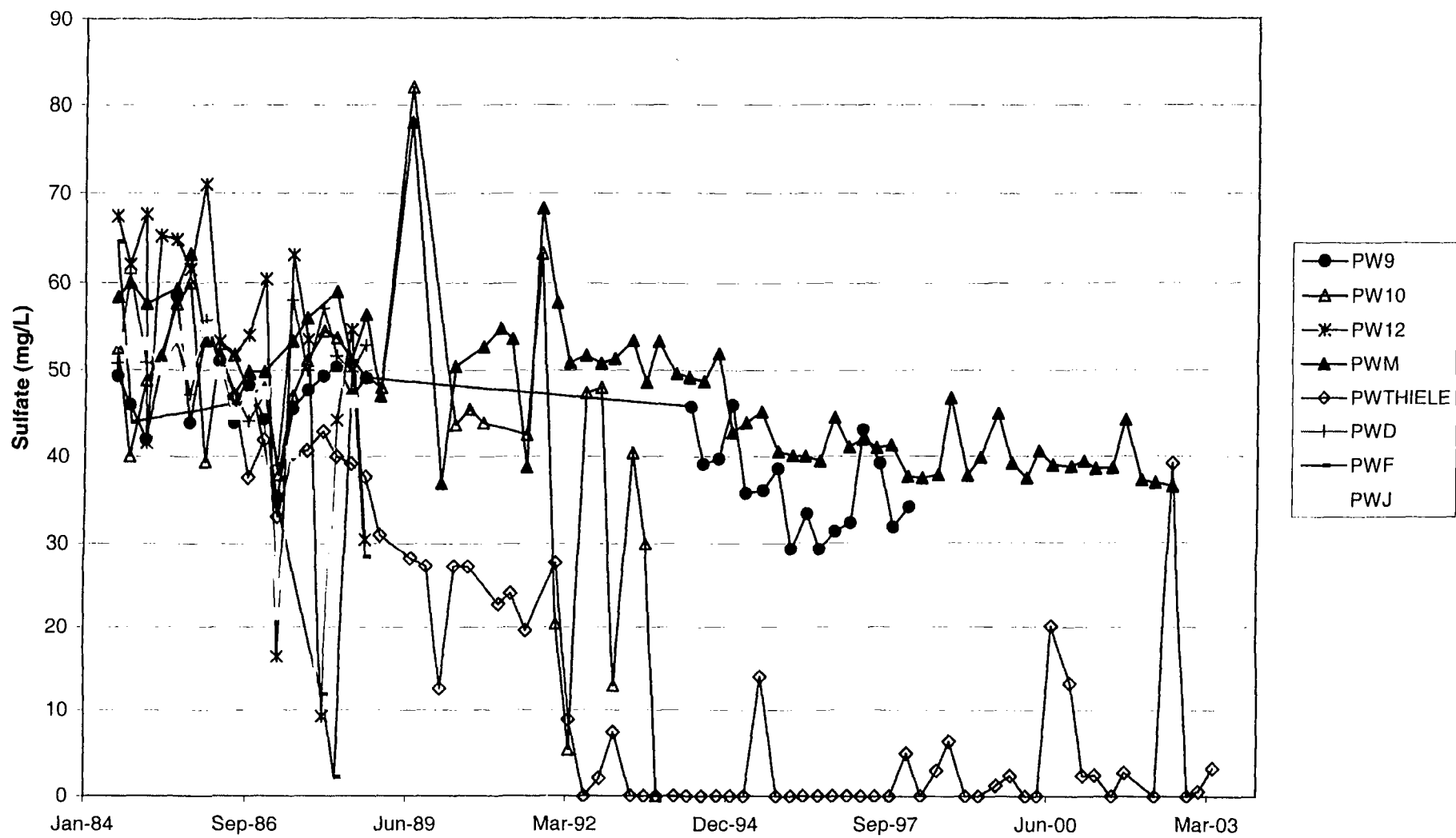
Note:
Non-detect values are graphed as "0"

N:\Jobs\208\2653\01\wp\tbl\expandedworkplan\Figures.xls\Figure 8

Figure 8
Private Well Nitrate
Southeast Flow Path
Muskego Sanitary Landfill

002-208

002-208

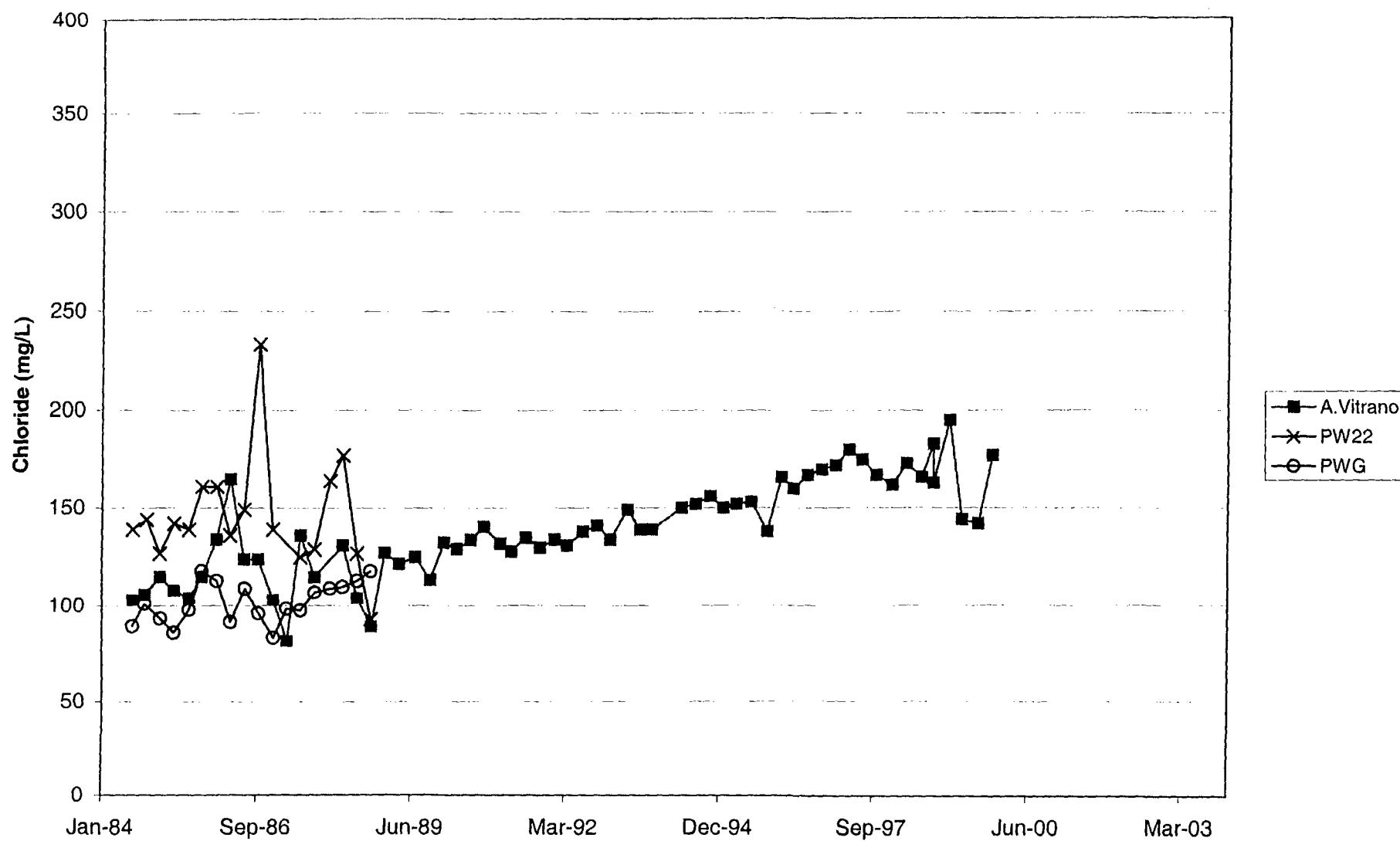


Note:
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N:\Jobs\208\2653\01\wp\tbl\expandedworkplanFigures.xls\Figure 9

Figure 9
Private Well Sulfate
Southeast Flow Path
Muskego Sanitary Landfill

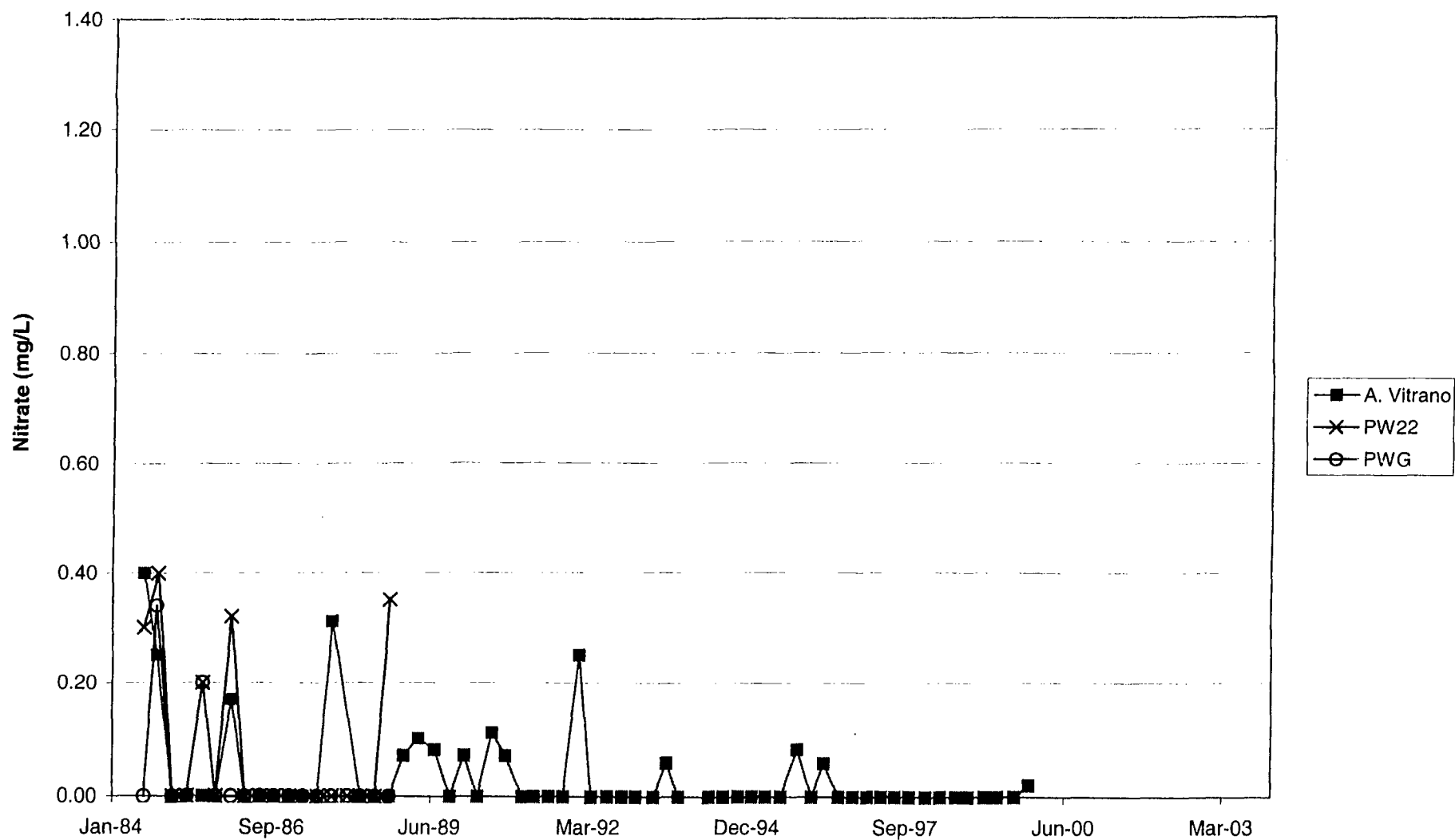
DRAY-200



Note:
Non-detect values are graphed as "0"

N:\Jobs\208\2653\01\wp\tbl\expandedworkplanFigures.xls\Figure 11

Figure 11
Private Well Chloride
Southern Flow Path
Muskego Sanitary Landfill



Note:
Non-detect values are graphed as "0"

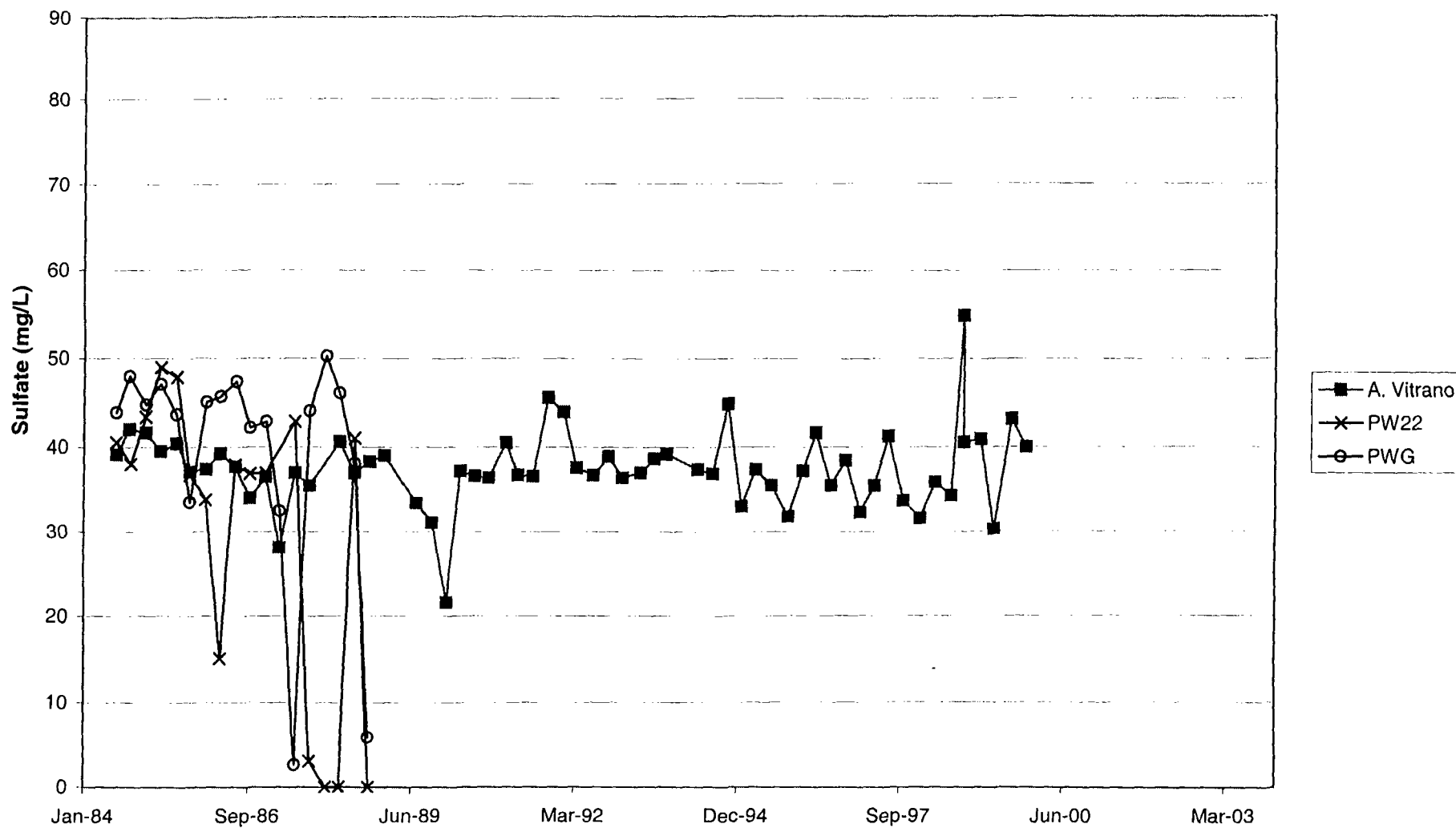
N:\Jobs\208\2653\01\wp\tbl\expandedworkplanFigures.xls\Figure 12

Figure 12
Private Well Nitrate
Southern Flow Path
Muskego Sanitary Landfill

DRW-208

A

208-2653-01



Note:
Non-detect values are graphed as "0"

N:\Obs\208\2653\01\wp\tbl\expandedworkplanFigures.xls\Figure 13

Figure 13
Private Well Sulfate
Southern Flow Path
Muskego Sanitary Landfill

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 18

**U.S. EPA LETTER REQUIRING PRPs TO UNDERTAKE
INSTITUTIONAL CONTROLS STUDY**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

July 9, 2004

Via Electronic Mail and
Regular Mail

Mr. Lawrence Buechel
Project Manager,
Muskego Site Groundwater Remediation Group
Waste Management Inc.
N96 W13600 County Line Road
Germantown, WI 53022

Re: Muskego Landfill Superfund Site
Request for Institutional Control Study
Muskego, WI
Civil Action Nos. V-W-92-C-173, and V-W-95-C-29

Dear Mr.Buechel:

As you may be aware, the United States Environmental Protection Agency ("EPA") is undertaking a review of the remedial action for the Muskego Sanitary Landfill Superfund Site ("Site"), which is being implemented by the Respondents pursuant to Unilateral Administrative Orders Nos. V-W-92-C-173, and V-W-95-C-29 ("UAOs"). EPA's periodic review is required under Section 121 of the Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 U.S.C. § 9621, which mandates that, no less often than every five years, EPA must review remedial actions where hazardous substances, pollutants or contaminants remain in place to assure that human health and the environment are being protected by the remedial action being implemented. Pursuant to the UAOs (See Section XI - EPA Periodic Review), Respondents are required to implement studies and investigations in order to permit EPA to conduct reviews of whether the Remedial Action is protective of human health and the environment.

With regard to the Institutional Controls, the UAOs specifically require the following:

* Within ten(10) days after the issuance of this Amendment to the Order, each Respondent that owns real property comprising any part of the Site shall record a copy of the Order and the Amendment thereto in the appropriate governmental office where land ownership and transfer records are filed or recorded, and shall ensure that the recording of this Order and Amendment is indexed to the title of each and every property owned by said Respondent at the Site, so as to provide notice to third parties of the issuance of terms of this Order and Amendment with respect to these properties. Also, such Respondents shall, within 20 days after the issuance of the Amendment to this Order, send notice of such recording and indexing to U.S. EPA” Ref: Letter dated June 6, 1995 Re: Unilateral Administrative Order Remedial Design/Remedial Action

* “Within 60 days after the effective date of the Administrative Order, the Respondents shall implement deed restrictions to prohibit future development (including, on-site excavations, building construction, drilling, installation of drinking water wells, or other uses of the Site which would be inconsistent with implementation or long term maintenance of the remedial action) for all of the Site property which any of them currently own. The Respondents, also within 60 days after the effective date of the Order, shall use their best efforts to implement those same restrictions on those portions of the Site property which are owned by persons other than the Respondents. The deed restrictions regarding future development of the Site shall be considered permanent.” Ref: Scope of Work incorporated into the Unilateral Administrative Order dated December 9, 1992

By this letter EPA requests that the Respondents submit an Institutional Control (“IC”) Study to EPA **within 30 days of your receipt of this letter**. Please provide EPA with a notice of intent to comply with this request **within 10 days of the date of receipt of this letter**.

The purpose of the IC study is to evaluate the status and effectiveness of government controls/land use restrictions/restrictive covenants required at the Site to maintain protection of human health and the environment at the Site. The Institutional Control Study must include and evaluate the following for all on-site and off-site areas where institutional controls have been implemented:

1. Description of all ICs

Describe all ICs for the Site which are or have been relied upon to assure that no incompatible use(s) will occur on or near the Site where contamination is present above a level which does not allow for unlimited use of the land with unrestricted exposure. Include any visual representations of the restricted areas such as maps or Graphical Information System (“GIS”) data. Describe all uses that shall not be allowed at these locations. Describe whether the restrictions on or near the property are required by the U.S. EPA’s ROD or other legal documents.

2. For all Proprietary Controls:

1. Site/Parcel legal description for an effective title search (e.g. metes and bounds or reference to recorded plat or other recorded survey)
2. Certified copy from the Recorder of Deeds of the recorded restrictive covenants, notices or other instruments
3. Title Search/Title Commitment regarding the current status of the title
4. Copies of encumbrances referenced in Schedule B of the Title Commitment
5. Evaluation as to whether encumbrances negatively impact the proprietary control
6. Inspection of the property to determine compliance with the restriction
7. Evaluation of the effectiveness of the restrictive covenants, notices or other instruments

3. For all Government Controls:

1. Certified copy of any ordinance(s) or well drilling restriction(s) promulgated by a governmental entity
2. Conduct an interview and provide a Summary of Interview with a responsible government official in charge of implementing the restriction. The interview should include at a minimum the following questions:

Where can information be obtained about the ordinance? What is the availability of this ordinance to homeowners, contractors, etc.? What type of monitoring is currently being conducted or has been conducted to determine compliance (i.e followup inspections to certify that no potable water wells remain or if present, are not being utilized) What procedures are in place for monitoring of requests for variance from or changes to the ordinance and Agency notification? What type of enforcement or remedy has been implemented if there is a violation of the ordinance?

3. Conduct an inspection and provide a Site Inspection Summary for areas where restrictions have been imposed to visually determine if governmental controls are preventing exposure (e.g., has land use or expected land use on or near the site changed?).
4. Evaluate the effectiveness of the ICs and provide a summary of relevant information.

5. Contacts

Provide the names, organizations, e-mails, addresses and phone numbers of the following:

1. Person(s) responsible for Implementation of ICs.
2. Person(s) responsible for Enforcement of ICs.
3. Persons(s) responsible for monitoring of ICs.
4. Person(s) responsible for reporting monitoring of ICs.
5. Person(s) responsible for IC termination initiation.

If you have any questions concerning this request, please contact me at 312- 886-4745.

Sincerely,

/original signed by Sheri Bianchin/

Sheri L. Bianchin
Remedial Project Manger
Superfund Division

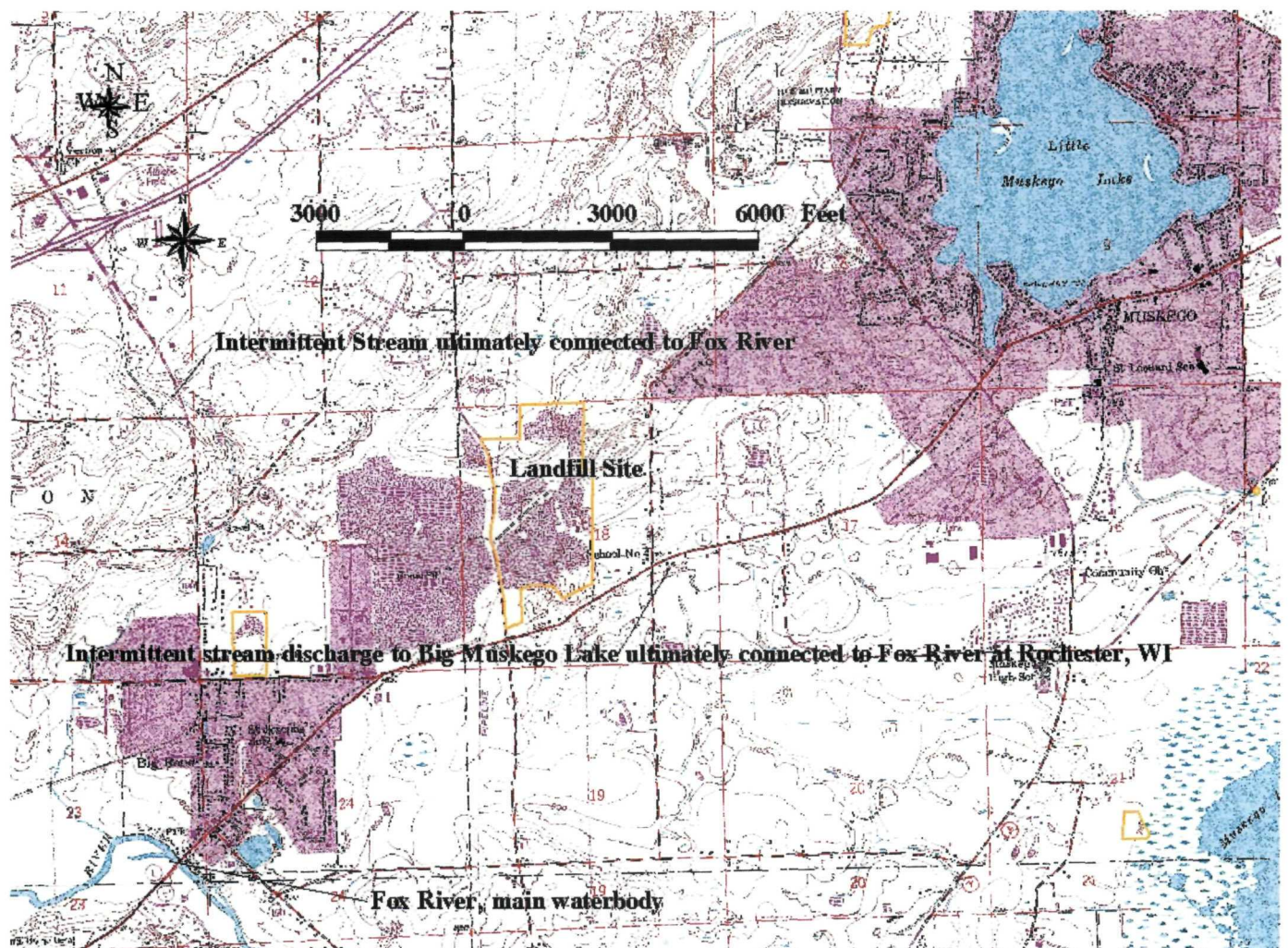
cc: Tom Krueger, U.S. EPA Site Attorney
Lisa Zebovitz, MSGRG Attorney
James C. Delewiche, WDNR
Sharon Schaver, WDNR
Nancy Payne, WDNR
Henry Nehls-Lowe, Health Department
Bob Kay, U.S. EPA

**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 18

MAP OF ULTIMATELY CONNECTED WATERBODIES

Muskego Sanitary Landfill Site Waterbodies



**MUSKEGO SANITARY LANDFILL
Second Five-Year Review Report**

EXHIBIT 19

**U.S. EPA LETTER REQUIRING PRPs TO UNDERTAKE
INSTITUTIONAL CONTROLS STUDY AND OTHER RELEVANT
INSTITUTIONAL CONTROLS INFORMATION**

CITIZEN POWER INC.

PO Box 324, Muskego, WI 53150

June 2, 2001

Dave DeAngelis, Mayor
City of Muskego
W182 S8200 Racine Ave.
Muskego, WI 53150

RE: Midwest Power - Wisconsin Power Projects - Muskego Site

Dear Mayor DeAngelis:

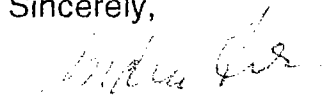
Enclosed are copies of several documents for your official records. First you will find a cover letter and copies of newspaper clippings sent to Christian Poindexter, CEO of Constellation Energy by Citizen Power, Inc.

The second document is a copy of a 30-year deed restriction on the proposed Midwest Power site in Muskego. Please note that when Waste Management purchased this property from the Wauers in 1983, they agreed that no commercial or residential development would be allowed on the property before the year 2013. To that end we believe Muskego's current zoning for this parcel is superceded by the aforementioned deed restriction. Therefore, we believe the City of Muskego is legally compelled to automatically reject any future application by Midwest Power-Wisconsin Power Projects-Constellation Energy for relevant site approvals, plans of operation, etc. to construct a commercial power plant operation on this property. Furthermore, we encourage the City to explore its options to re-zone this parcel "conservancy", bringing it into closer conformity with the existing deed restriction currently in effect.

A copy of a letter we sent advising the PSC of this deed restriction is also enclosed.

Please place all these items on your official Common Council agenda as "communications" from Citizen Power, Inc. regarding the Midwest Power site, and thank you for your on-going attention to this matter.

Sincerely,



Andrea Frank, MS, PhD Cand.
Chairman of the Board

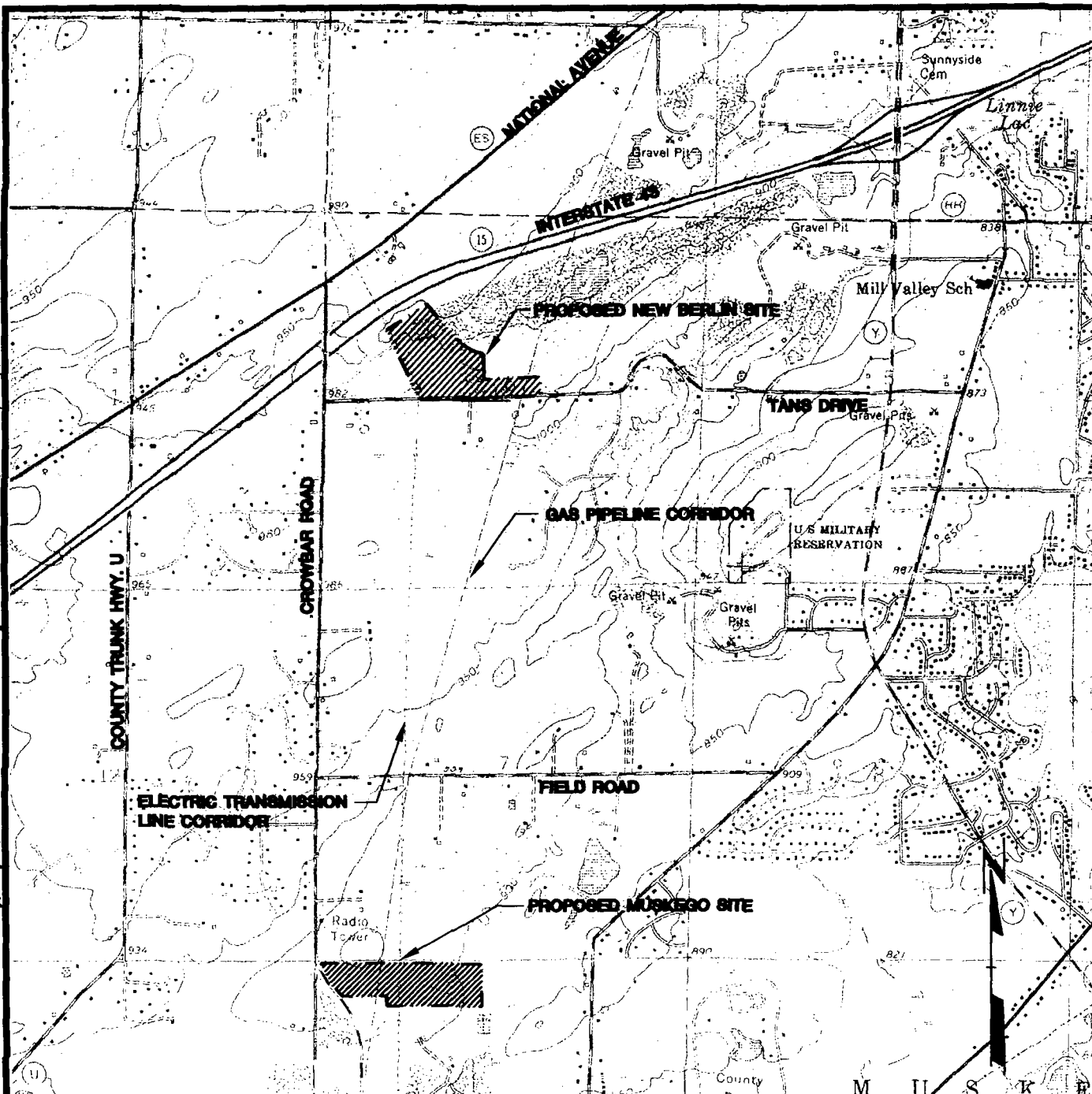
cc: Kurt Barikmo, CP President
Shari Bosmans, United Citizens NB
Mark Hazelbaker, Attorney
Alan Kunert, Vernon Town Chairman
Mary Lazich, State Senator
Carol Sternrich, PSC
Ted Wysocki, New Berlin Mayor

bcc: Sheri Bianchini

Plot Time: 2:07:59 PM
 Attached Xref's: No xref's attached.
 Attached Image: UNIDENTIFIED2.TIF; site map.bmp;

Scale: 1"=2000'
 Dwg Size: 125414 Bytes
 Plot Date: Tuesday, July 3, 2001

Plot Date: 7/3/2001
 Drawing Name: J:\05400\04\54000459.dwg
 Operator Name: BUDIMLIB

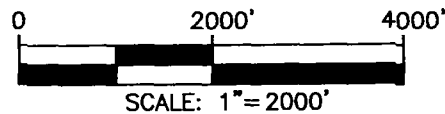


LEGEND

	PROPOSED SITE LOCATION		CHURCH/CEMETERY
	PRIMARY HIGHWAY		GRAVEL PIT
	SECONDARY HIGHWAY		SCHOOL
	LIGHT DUTY ROAD		WETLANDS
	STRUCTURE		GAS PIPELINE CORRIDOR
	UNIMPROVED ROAD		ELECTRIC TRANSMISSION LINE CORRIDOR

NOTES

1. BASEMAP- MUSKEGO QUADRANGLE
 7.5 MINUTE MAP, USGS 1957,
 REVISED 1994



RMT INC.

SITE LOCATION MAP PROPOSED NEW BERLIN / MUSKEGO PEAKING PROJECT

WISCONSIN PROJECTS, LLC.

DRAWN BY:	BUDIMLIB
APPROVED BY:	R/V
PROJECT NO.	05400.04
FILE NO.	54000459.DWG
DATE:	JULY 2001

FIGURE 1

MEMORANDUM OF
OPTION AGREEMENT

2580999

REGISTER'S OFFICE
WAUKESHA COUNTY, WI
RECORDED ON

08-04-2000 2:07 PM

MICHAEL J. HASLINGER
REGISTER OF DEEDS

REC. FEE: 4.00
REC. FEE-CD: 4.00
REC. FEE-ST: 2.00
TRAN. FEE:
TRAN. FEE-STATE:
PAGES: 1

RE: A parcel located in of the NW¼ and the SW¼, Section 18, Town 5
North, Range 20 East, City of Muskego, Waukesha County,
Wisconsin

Notice is hereby given that Waste Management of Wisconsin,
Inc., as "Optionor," and Midwest Power, LLC, as "Optionee," have entered
into an Option Agreement and Contract of Sale ("Option Agreement")
dated May 8, 2000, whereby Optionor has granted to Optionee the
exclusive option to purchase the above described property (the "Property")
to wit:

The option rights granted to Optionee pursuant to the terms of
said Option Agreement shall commence as provided in said Option
Agreement, and shall expire nine (9) months thereafter.

David W. Shutte, Esq.
P.O. Box 2187
Lake Oswego, OR 97035

This memorandum is executed for purposes of recordation in the
Office of the Register of Deeds of Waukesha County, in order to give
notice to all of the terms of said Option Agreement and reference is hereby
made to the Option Agreement for all pertinent purposes. This
Memorandum in no way defines, limits or modifies said Option
Agreement.

EXECUTED at Brookfield, Wisconsin this 4th day of August, 2000.

OPTIONOR: WASTE MANAGEMENT OF WISCONSIN, INC.

By:

David E. Stewart

Attorney for Optionor

201-55651654 510101

STATE OF WISCONSIN)

)SS.

COUNTY OF WAUKESHA)

This instrument was acknowledged by me this 5 day of August, 2000, by David E.
Stewart, attorney for Waste Management of Wisconsin, Inc., a Wisconsin corporation, on behalf of said
corporation.

(SEAL)



Notary Public in and for the State of Wisconsin

My commission expires:

GALE POLASKI

Notary Public - State of Wisconsin
My Commission Expires March 3, 2002

THIS INSTRUMENT WAS DRAFTED BY:

Attorney David E. Stewart
250 N. Sunnyslope Road, Suite 300
Brookfield, WI 53005

Stewart/Waste/Memorandum of Option Agreement2

Carl Wauer
S81 W17890 Riese Drive
Muskego, Wisconsin 53150

June 14, 2001

Mr. Jack Dowden
Midwest Area Director - Closed Sites Management Group
Waste Management of Wisconsin, Inc.
W124 N9355 Boundary Road
Menomonee Falls, Wisconsin 53051

Mr. David W. Shutte
Midwest Power, LLC
Co-Operating Manager
1325 Wiley Road, Suite 158
Schaumburg, Illinois 60173

RE: Clarification of Deed Restriction

Dear Messrs. Dowden and Shutte:

I, Carl Wauer, do hereby clarify the intent of the deed restriction (the "Deed Restriction") recorded on November 9, 1983 as Document No. 1236208 on behalf of myself and my mother, Lydia Wauer (who is deceased) as it concerns the property ("Property") described in the Deed Restriction which, in turn, is the subject property set forth in the Option Agreement and Contract of Sale ("Option Agreement") dated May 8, 2000, by and between Midwest Power, LLC and Waste Management of Wisconsin, Inc. In pertinent part, the Deed Restriction states that the owner of the Property 'Will not undertake commercial or residential development of the property [Property] for a period of thirty (30) years from the date hereof.'

I, Carl Wauer, confirm, represent and warrant to Midwest Power, LLC ("Midwest Power") and to Waste Management of Wisconsin, Inc. and their successors and assignees that the Deed Restriction allows, as a permitted use, industrial uses of the Property which is also the same subject property as set forth in the Option Agreement, including such industrial uses as (i) a landfill operation, and (ii) an electric generating plant and the associated infrastructure assets for such electric generating plant. I, Carl Wauer, also agree to execute and to record with the applicable register of deeds any necessary documents as requested by Midwest Power in order confirm the intent of the Deed Restriction as set forth in this letter and to eliminate any title-related matters regarding the Deed Restriction as it concerns the Property.

Sincerely,



Carl Wauer

AUTHENTICATION

Signature of Carl Wauer authenticated this 19th day of June, 2001.

A handwritten signature in black ink, appearing to read 'David E. Stewart', written over a horizontal line.

David E. Stewart
Member of State Bar of Wisconsin
State Bar No. 1013409

**THIS INSTRUMENT
WAS DRAFTED BY:**
David W. Shutte, Esq.
1325 Wiley Road
Suite 158
Schaumburg, IL 60173

DOCUMENT NO.

STATE BAR OF WISCONSIN FORM 1-1982
WARRANTY DEED

1236208

1236208
THIS SPACE RESERVED FOR RECORDING DATA

RECORDED ON 7-7-83

1983 NOV -9 PM 2:52

575 INCE 544

REGISTER OF DEEDS

REEL 575 INCE 544

RETURN TO
D.E. STEWART
6515 GERMND RD
MADISON, WI 53715

Tax Parcel No: 600

This Deed, made between Carl Wauer and
Lydia WauerGrantor,
and Waste Management of Wisconsin, Inc.

Witnesseth, That the said Grantor, for a valuable consideration

conveys to Grantee the following described real estate in Kaukausha
County, State of Wisconsin:TRANSFER
\$ 675.00
FEE

Legal description attached as Exhibit A

This is not homestead property.
(is) (is not)

Together with all and singular the hereditaments and appurtenances thereto belonging:

And Carl Wauer and Lydia Wauer
warrants that the title is good, indefeasible in fee simple and free and clear of encumbrances except Grantee
will not undertake commercial or residential development of the property
for a period of thirty (30) years from date hereof.
and will warrant and defend the same.Dated this 28th day of October, 1983

(SEAL)

Carl Wauer

(SEAL)

Carl Wauer

(SEAL)

Lydia Wauer

(SEAL)

Lydia Wauer

AUTHENTICATION

Signature(s) Carl Wauer and
Lydia Wauerauthenticated this 28 day of October, 1983Sherwin C. Peltin
TITLE: MEMBER STATE BAR OF WISCONSIN(If not
authorized by § 704.06, Wis. Stats.)THIS INSTRUMENT WAS DRAFTED BY
Attorney Sherwin C. Peltin

ACKNOWLEDGMENT

STATE OF WISCONSIN

County, SS.Personally came before me this 28 day of October, 1983, the above namedto me known to be the person who executed the
foregoing instrument and acknowledge the same.Notary Public Sherwin C. Peltin County, Wis.
My Commission is permanent (if not, state expiration
date: 10-31-84)(Signatures may be authenticated or acknowledged. Both
are not necessary.)

Signatures of persons signing in any capacity should be typed or printed below their signatures.

WARRANTY DEED

STATE BAR OF WISCONSIN
FORM No. 1-1982Wisconsin Legal Blank Co. Inc.
Milwaukee, Wis.

C 11214

REEL 575 PAGE 545

LEGAL DESCRIPTION - EXPANSION PARCEL

A PARCEL OF LAND LOCATED IN THE NW 1/4 OF SECTION 18, T5N, R20E,
TOWN OF MUSKEGO, WAUKESHA COUNTY, WISCONSIN, MORE PARTICULARLY DESCRIBED
AS FOLLOWS:

COMMENCING AT THE N 1/4 CORNER OF SECTION 18, SAID POINT ALSO
BEING THE POINT OF BEGINNING OF THIS DESCRIPTION; THENCE S87°20'04"W,
1325.95 FEET; THENCE S01°11'25"E, 710.29 FEET; THENCE S90°00'00"E,
1010.64 FEET; THENCE N01°32'30"N, 272.88 FEET; THENCE S86°55'02"E, 316.97
FEET; THENCE N01°06'54"W, 516.17 FEET TO THE POINT OF BEGINNING, SAID
PARCEL CONTAINS 20.631 ACRES MORE OR LESS.

EXHIBIT A-1

GEN/mif
[mif-14]-18]



1235217

REC 575 PAGE 559

RIGHT OF FIRST REFUSAL

In consideration of the sum of One Dollar (\$1.00) this day in hand paid to Waste Management of Wisconsin, Inc., a domestic corporation (hereinafter "GRANTOR"), receipt whereof is hereby acknowledged, and in further consideration of the conditions and covenants of a Purchase-Sales Agreement entered into between Grantor and Carl Wauer and Lydia Wauer (hereinafter "GRANTEE") on August 29, 1983 and subsequently amended by the parties, Grantor hereby gives to said Grantee the right of first refusal to purchase certain real property which is the subject of the above-referenced Purchase-Sales Agreement; said property located in Section 18 in the City of Muskego, County of Waukesha, State of Wisconsin, as more fully described in Exhibit A, attached hereto and made a part hereof.

Grantor agrees not to sell or otherwise transfer its interest in the above-described real estate except as hereinafter provided. If at any time during the term of this right of first refusal Grantor shall receive a bona fide offer from any person which Grantor is willing to accept from any person or entity ready, willing and able to purchase all or any part of said property, then Grantor shall deliver written notice to Grantee of said offer. Said notice shall include the name and address of the offeror, a description of the property subject to the offer, the price offered, and the terms and conditions of the offer, and shall also notify Grantee of Grantor's intention to accept the same upon the terms and conditions of said offer. An offer shall be deemed bona fide if it is in writing, contains all the terms and provisions necessary for the consummation of the purchase, and provides for the payment of the purchase price in cash, or cash and/or deferred payments of cash, secured by a mortgage on the above-described real estate, or provides for the sale by land contract of the above-described real estate.

Grantee shall have thirty (30) days after receipt of said written notice to exercise this right of first refusal to purchase the property described in the notice. The purchase price to be paid by the Grantee to the Grantor shall be the amount of the bona fide offer from the third party or \$450,000.00, whichever is less. Grantee shall give written notice of its acceptance of said offer within that 30-day period if Grantee wishes to exercise its right to purchase, and the purchase shall occur upon the terms and conditions of the offer (except the purchase price shall be established as described above) and shall close on the date specified therein.

If Grantee does not exercise said right to purchase the above-described real estate within said period, by giving written notice thereof to Grantor, Grantor may accept said offer and complete said sale.

If the terms of the offer are thereafter changed or if the sale by Grantor on the terms submitted is not completed within sixty (60) days after the expiration of the above-mentioned 30-day period, this right of first refusal shall be revived. Notwithstanding the foregoing, in the event that Grantee fails to exercise the aforesaid right of first refusal and the sale is not consummated as herein provided, then the right of first refusal herein granted shall remain in effect.

This right of first refusal given by the Grantor is personal to the Grantee and shall not be assignable, transferable or otherwise alienable. Additionally, in the event Grantee exercises this right of first refusal, Grantor makes no warranties to Grantee as to what uses, if any, Grantee could make of the real property subject to this right of first refusal. The Grantee acknowledges that the Grantor intends to use the property subject to this right of first refusal for landfilling purposes.

This right of first refusal expires thirty (30) years
from the date of execution of this document.

WASTE MANAGEMENT OF WISCONSIN, INC.

BY James E. O'Connor, Vice Pres.

ATTEST: Richard C. Ancelet, Asst. Secy.

STATE OF WISCONSIN)
COUNTY OF MILWAUKEE) ss

On this 21st day of October, 1983, personally
came before me the above named James E. O'Connor, Vice
President, and Richard C. Ancelet, Assistant Secretary, to
me known to me to be the corporate officers of Waste
Management of Wisconsin, Inc. and who executed the foregoing
instrument and acknowledged the same on behalf of said
corporation.

[Signature]
Notary Public, State of Wisconsin
My Commission is permanent.

This instrument was drafted by:

Attorney David E. Stewart
~~Suite 120~~
~~6515 Grand Tower Plaza~~
~~Milwaukee, Wisconsin 53219~~

Return to:
Atty. Sherwin Deltin
633 W. Wisconsin Ave.
Milwaukee, WI
53203

Attachment 3

**July 2, 2001, Letter to the Wisconsin Public Service Commission
Clarifying Deed Restriction**



*Integrated
Environmental
Solutions*

744 Heartland Trail 53717-1934
P.O. Box 8923 53708-8923
Madison, WI
Telephone: 608-831-4444
Fax: 608-831-3334

July 2, 2001

Ms. Carol Stemrich
Wisconsin Public Service Commission
610 North Whitney Way
Madison, WI 53562

**Subject: Clarification of Deed Restriction on Muskego Alternate Site
Docket No. 9342-CE-100**

Dear Carol:

It has come to our attention that the Citizen Power, Inc. group has raised a question regarding a deed restriction that is in place as it concerns Wisconsin Power Projects, LLC's alternate site proposal in Muskego, Wisconsin. There is an October 28, 1983 deed restriction concerning that parcel that was executed between Waste Management of Wisconsin, Inc. (the current land owner) and Carl and Lydia Wauer (the previous land owners who recorded the October 28, 1983 deed restriction). That deed restriction states that: "Grantee will not undertake commercial or residential development of the property for a period of thirty years from date hereof."

Midwest Power, LLC, one of two members of Wisconsin Power Projects, LLC, spoke with Mr. Carl Wauer (Lydia Wauer, his mother, is deceased) to clarify the intent of this deed restriction. Mr. Wauer subsequently signed a notarized letter (see attached) that indicates that while the deed restriction limits commercial and residential development of the property, industrial uses of the property, such as an electric generating plant, is a permitted use per the deed restriction. Mr. Wauer has also agreed, as part of the attached letter, to execute and to record with the applicable register of deeds any necessary documents to confirm the intent of the deed restriction and to eliminate any title-related matters regarding the deed restriction as it concerns the proposed alternate site.

Please feel free to contact me at (608) 662-5283 if you have any questions regarding this submittal.

Sincerely,

RMT, Inc.

A handwritten signature in cursive script that reads 'Bob Vetter'.

Robert J. Vetter, P.E.
Project Manager

Attachments: Notarized Letter

Ms. Carol Stemrich
610 North Whitney Way
July 2, 2001
Page 2

cc: Chuck Tyburk, Midwest Power, LLC
David Shutte, Midwest Power, LLC
Jack Dowden, Waste Management of Wisconsin, Inc.
Steve Morris, Constellation Power, Inc.
Dori Costa, Constellation Power, Inc.
Mark Lake, New Berlin City Planner
David DeAngelis, City of Muskego Mayor
Karen Schuh, Town of Vernon, Chairman
Sheri Bianchin, USEPA
Steve Ugoretz, WDNR

well away from these historical disposal areas..."

RMT also reported that they had confirmed with WMWI that a Title Commitment had been provided to Wisconsin Power indicating that no deed restriction existed for the proposed peaking facility Site.

Another letter dated July 2nd letter was provided in the application; that letter stated: "there is an October 28, 1983 deed restriction concerning that parcel that was executed between WMWI (the current operator and land owner) and Carl and Lydia Wauer (the previous land owners) who recorded the October 28, 1983 deed restriction. That deed restriction states that "Grantee will not undertake commercial or residential development of the property for a period of thirty years from the date here of."

IC Follow-up Requirements.

U.S. EPA has requested that the PRPs conduct an IC study to determine whether the necessary ICs are in place and effective. The following steps must be followed:

A) Determination as to what part of Site should be subject to Institutional Controls by obtaining:

- i) legal description (or map) of areas that do not allow unlimited and unrestricted use;
- ii) title search/commitment regarding the current status of the title of these areas;
- iii) copies of encumbrances referenced in Schedule B of the Title Commitment;
- iv) evaluate whether encumbrances would negatively impact the proprietary control and obtain subrogation agreements from any appropriate prior in time owners of such encumbrances.

In addition, potential holders of the proprietary control must be identified.

B) Evaluation of the RODs and UAOs must be made to determine what is required and whether additional steps must be taken to assure the protectiveness, ^{and} followup with the appropriate documentation. For example, if the IC is an agreement with the owner to restrict land or groundwater use, obtain a current title search/title commitment to confirm its existence and whether it "runs with the land".

C) Determination of Governmental Controls must be made. Current government controls, such as ordinances, must be obtained and confirmed that they are still in effect and have not been amended.

D) Determination of Proprietary Controls must be made. After a current title search/title commitment is received for evaluation of proprietary controls on the properties, the following must be done: Obtain copies of encumbrances referenced in the title commitment. Evaluation must be made as whether the proprietary control such as restrictive covenant shows up in the chain of title thereby providing notice to future owners of land and groundwater use restrictions;

SDMS US EPA Region V

Imagery Insert Form

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Illegible due to bad source documents. Image(s) in SDMS is equivalent to hard copy.

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This document contains highly sensitive information. Due to confidentiality, materials with such information are not available in SDMS. You may contact the EPA Superfund Records Manager if you wish to view this document.

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Unscannable Material:

Oversized X or _____ Format.

Due to certain scanning equipment capability limitations, the document page(s) is not available in SDMS.

Specify Type of Document(s) / Comments:

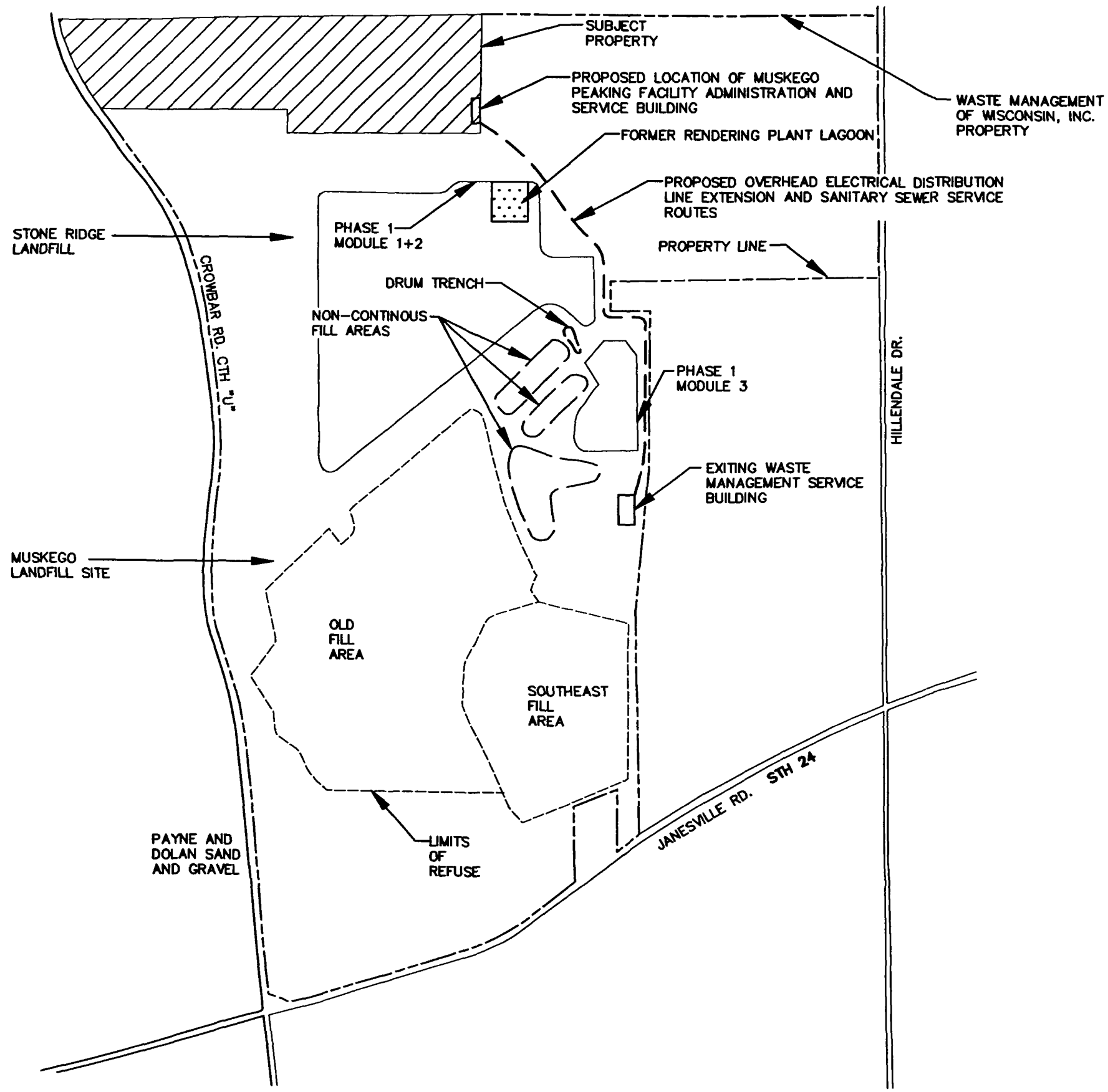
(Part of Exhibit 19) ALTA/ACSM Land Title Survey; 2000 Aerial Photograph; Drawing on parcel portion of deed restriction

☐

Document is available at the EPA Region 5 Records Center.

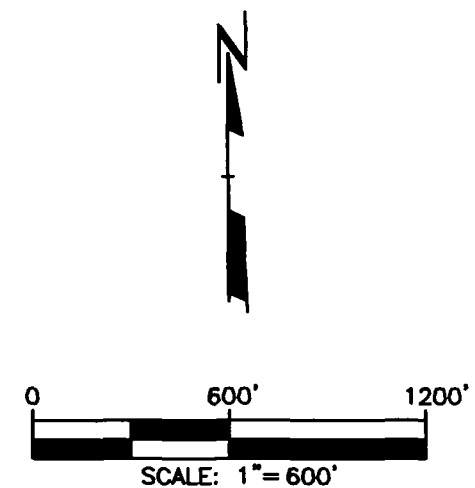
Specify Type of Document(s) / Comments:

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Rotation = 90.000000
Plot Date = Thu Aug 16 08:31:07 2001
Attached Xref's: No xref's attached.



NOTES

1. BASE MAP DEVELOPED FROM DRAWING 13527-7 PREPARED BY WARZYN INC., DATED APRIL 1989.
2. MODIFIED FROM WARZYN 1992. REMEDIAL INVESTIGATION/FEASIBILITY STUDY. MUSKEGO SANITARY LANDFILL. WASTE MANAGEMENT OF WISCONSIN, INC. CITY OF MUSKEGO, WAUKESHA CO., WISCONSIN.



EXISTING CONDITIONS

RMT.

DWN. BY: BUDIMLIB
APPROVED BY: *Therh*
DATE: AUGUST 2001
PROJ. # 05400.02
FILE # 54000211.DWG

FIGURE 2

**SPECIAL WELL CASING DEPTH
REQUIREMENT AREAS @*#**

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Brown 02/25/88 Area 1	Town of Ledgeview (<i>Scrays Hill</i>) T23N, R21E - Section 32 - SW¼ - N½ of the SE¼ - S½ of the NE¼	VOCs	Contact DNR Northeast Region Office for <u>required</u> approval
Calumet 02/11/88 Area 2	Town of Charlestown (<i>Gravesville</i>) (near Chilton) T18N, R20E - Section 8 - SW¼ - Section 7 - Government Lots 3 and 4 - Section 18 - Government Lots 1 and 2 - Section 17 - NW¼	Bacteria/Nitrate	Contact DNR Northeast Region Office for <u>required</u> approval
Chippewa 12/90 Area 3	Town of Hallie (<i>North Eau Claire and Village of Hallie Area</i>) T28N, R9W - Section 35 - SW¼ - W½ of NW¼ of the SE¼ - Portions of the NW¼ - Section 26 - Portions of the SW¼ (Continued on next page)	VOCs	Contact DNR West Central Region Office for <u>required</u> casing depth and better definition of affected area.

@ NOTE: Section NR 812.14(1)(j) requires wells that are constructed to withdraw water from any of the aquifers beneath the “Maquoketa” Shale and the “Niagara” formation (dolomite) in the eastern part of the State shall be cased and cement-grouted at least through the “Niagara” formation. If a liner is used to case off the “Niagara” formation, the “Maquoketa” Shale formation or both, the liner shall be installed in a manner conforming with the requirements of s. NR 812.21(1).

*** NOTE:** If a well is less than 1,200 feet from a landfill, a landfill variance is still required.

NOTE: Section NR 812.(16), Wis. Adm. Code, states: When a quarry is within 1,200 feet of any proposed well, the upper enlarged drillhole and well casing pipe depth requirements shall be referenced from the bottom of the quarry. When the bottom of the existing or proposed quarry is or will be at an elevation higher than the elevation of the ground surface at the well site, this requirement does not apply. If a well site is within 1,200 feet of a quarry and is also located within a special well casing requirement area, the more stringent requirement shall be used.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Chippewa 12/90 Area 3	Town of Hallie (North Eau Claire and Village of Hallie Area) -- (Continued) T28N, R9W - Section 27 - Portions of the E½ of the SE¼ - Section 34 - Portions of the SE¼ east of US Hwy 53 - Portions of the E½ of the NE¼	VOCs	Contact DNR West Central Region Office for <u>required</u> casing depth and better definition of affected area.
Dane 02/23/01 Area 71	Town of Cottage Grove (<i>Hydrite Chemical Co. Area</i>) T7N, R11E - Sections 10, 11, 14, 15 and 16 -- The following areas: <u>ZONE 1</u> Section 16 NE¼ <u>ZONE 2</u> Section 15 SE¼ of the SW¼ Section 15 SW¼ of the SE¼ <u>ZONE 3</u> All of the following areas not listed above in ZONE 2, including: Section 10 S½ Section 11 SW¼ of the SW¼ SE¼ of the SW¼ (that portion south of County BB) SW¼ of the SE¼ (that portion south of County BB) Section 14 W½ W½ of the E½ Section 15 Entire section Section 16 SE¼	VOCs	Contact the DNR South Central Region Office for <u>required</u> approval.
Dane 09/18/00 Area 4	Town of Middleton (<i>Refuse Hideaway Landfill Area</i>) T7N, R8E - Section 7 NE¼ of the SW¼ SE¼ of the SW¼ SE¼ S½ of the NE¼ of the NE¼ SE¼ of the NE¼ (Continued on next page)	VOCs	Contact the DNR South Central Region Office for the <u>required</u> casing depth.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Dane 09/18/00 Area 4	Town of Middleton (<i>Refuse Hideaway Landfill Area</i>) – (Continued) T7N, R8E - Section 8 S½ of the NW¼ of the NW¼ SW¼ of the NW¼ All of the NW¼ of the SW¼ north and west of Twin Valley Road and north of US Highway 14 All of the SW¼ of the SW¼ north and west of Twin Valley Road S½ of the NE¼ of the NW¼ SE¼ of the NW¼ All of the NE¼ of the SW¼ north of Highway 14	VOCs	Contact the DNR South Central Region Office for the required casing depth.
Dane 01/01/94 Area 68	Town of Middleton (<i>Cherrywood Subdivision Area</i>) T7N, R8E - Section 30	Bacteria	Recommended 275 feet of casing to terminate into the St. Peter Sandstone
Dodge 04/23/97 Area 5	Town of Beaver Dam (<i>Rolling Meadows Subdivision</i>) T12N, R14E - Section 20 - N½ and east of the railroad tracks - Section 21 - NW¼	Bacteria	Recommended Cement-grouted casing at least 15 feet into the St. Peter sandstone
Dodge 10/6/72 Area 6a	Town of Leroy (<i>Area of Shallow Niagara Dolomite</i>) T13N, R16E - Section 22 - SE¼ - Section 23 S½ - Section 26 - N½ - Section 27 - NE¼	Bacteria	Casing to base of Maquoketa Shale <u>required</u> .
Dodge 10/6/72 Area 6b	Town of Leroy (<i>Area of Shallow Niagara Dolomite</i>) - Sections 22, 23, 26 and 27 – Those portions that are not in Area 6a (above). - Section 24 - W½ - Section 25 - W½	Bacteria	Contact DNR South Central Region Office for <u>required</u> casing depth amount.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Dodge 04/2/97 Area 7	Town of Lomira (Knowles Area) (Area of Shallow Niagara Dolomite) T13N, R17E - Section 19 - S½ of the SE¼ - Section 30 - N½ of the NE¼	Bacteria	Wells completed below Maquoketa Shale <u>must</u> be cased and grouted through entire Maquoketa Shale unit
Door 11/5/57 10/25/71 08/6/74 Area 8a	Entire County (Area of high bedrock)	Bacteria	100 to 170' casing <u>required</u> See DNR maps Contact DNR Northeast Region Office for <u>required</u> casing depth in transition-zoned areas
Door 08/13/90 Area 9	Entire County (Pesticide Mixing Sites) - Within 1,200 feet of pesticide mixing sites. - (Contact DNR Northeast Region Office for a map of the mixing sites.)	Lead/Arsenic	Contact DNR Northeast Regional Office for <u>required</u> casing depth.
Dunn 12/90 Area 10	Town of Red Cedar (Village of Rusk)(Ag Coop) T28N, R12W - Sections 8, 15, 16, 17 and 18 (portions of these sections)	Herbicides	Contact DNR West Central Region Office for <u>required</u> approval and better definition of affected area
Eau Claire 06/4/92 Area 11	Town of Washington (Closed Landfill – Papermill Sludge) T27N, R8W - Sections 20 and 29 (West portion) - The area bounded on the east by Six-Mile Creek, on the west by the eastern boundary of sections 19 & 30, on the north by the Eau Claire River, and on the south by the southern boundary of the Pope and Talbot property with that southern boundary line running east to intersect Six-Mile Creek	VOCs	Any new water supply well constructed shall be sampled upon completion and tested for volatile organic compounds (VOC's) using EPA Method 502.2 or 524.2 and the results sent to the West Central Region Office to determine <u>required</u> casing depth.
Florence 11/4/97 Area 12	Town of Aurora (Hillcrest School – Menomonee River Area) T38N, R19E - Section 2 (That portion southwest of the Menomonee River) - Section 3 - S½ of the S½ - Section 10 (Entire section)	Naturally occurring Arsenic	No special well construction required. DNR recommends well water be tested for arsenic after construction and one year later.
Jackson 01/12/94 Area 13	Town of Brockway/City of Black River Falls (City Landfill Area) T21N, R4W - Section 11 - Portions of the SE¼ - Portions of the SW¼ - Section 14 - That portion of the NE¼ located northeast of Interstate Highway 94, north of Old State Highway 54, west of Levis Creek Road, south of Levis Creek and east of the Black River. - (Contact DNR West Central Region Office for detailed map of area.)	VOCs	Contact DNR West Central Region Office for <u>required</u> special casing depth.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Jackson 10/23/96 Area 14	Town of Northfield (<i>Village of Northfield Lust Sites</i>) T23N, R6W - Section 22 - Starting at the southwest corner of the SE¼ of the NW¼ of; then east along the south line of the SE¼ of the NW¼ to the numbered tributary of Pigeon Creek 22-BBC; then northwesterly along tributary 22-BBC to Pigeon Creek; then westerly along Mill Road to CTH FF; then southerly along CTH FF and along the west line of the SE¼ of the NW¼ of Section 22 to the point of beginning.	VOCs	Cement-grouted casing 10' into sandstone bedrock <u>required</u> . (About 100' to sandstone) Upper-enlarged drillhole <u>must</u> be at least 10-inch diameter. A VOC sample is <u>required</u> . The Well Driller <u>must</u> notify DNR West Central Region at least 48 hours prior to the construction of the well.
Jefferson 06/8/99 Area 15a	Town of Koshkonong (<i>Superior Valley Meadows Landfill Area</i>) (Zone 1) T5N, R14E - Sections 25, 26, 35 and 36 - Within the area bounded by the western boundary Section 35 and 26, south of Creamery Road, west of Highway 12, south of Cheesbrough Road, west of Buckingham Road, south of Meske Road, and west of Galloway Creek. And north of the ½ section line of Sections 35 and 36, from Galloway Creek to the western boundary of Section 35.	VOCs	240' of casing with cement grout <u>required</u> .
Jefferson 06/8/99 Area 15b	Town of Koshkonong (<i>Superior Valley Meadows Landfill Area</i>) (Zone 2) T5N, R14E - Sections 25, 26, 35 and 36 (The remainder of these sections not included in Area 15a above.) - Section 27 - SE¼ -- The area east of Allen Creek. - Section 34 - N½ -- The area east of Allen Creek.	VOCs	Contact DNR South Central Region Office for <u>required</u> approval
Jefferson 06/8/99 Area 15c	Town of Koshkonong (<i>Superior Valley Meadows Landfill Area</i>) (Zone 3) T5N, R14E - Section 27 - SE ¼ east of Allen Creek - Section 34 - N ½ east of Allen Creek	VOCs	<u>Recommended</u> Contact DNR South Central Region Office for approval
Kewaunee 11/5/57 10/25/71 08/6/74 Area 8b	Town of Red River (<i>Extension of Door Co Special Casing Depth Area</i>) T25N, R23E - Sections 1 through 6	Bacteria	100 to 170' <u>required</u> See DNR maps Contact DNR Northeast Region Office for approval outside zoned areas
Kewaunee 11/5/57 10/25/71 08/6/74 Area 8b	Town of Lincoln (<i>Extension of Door Co Special Casing Depth Area</i>) T25N, R24E - Sections 1 through 6	Bacteria	100 to 170' <u>required</u> See DNR maps Contact DNR Northeast Region Office for approval outside zoned areas

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Kewaunee 11/5/57 10/25/71 08/6/74 Area 8b	Town of Ahnapee (<i>Extension of Door Co Special Casing Depth Area</i>) T25N, R25E - Sections 1-6 T25N, R26E - Section 6	Bacteria	Contact DNR Northeast Region Office for <u>required</u> approval.
Lincoln 09/27/95 12/2/96 Rev. 02/22/01 Area 17	Town of Merrill (<i>Merrill Landfill Area</i>) T32N, R7E - Section 29 - SW¼ - Section 30 - SE¼ - Section 31 - NE¼ - Section 32 - NW¼, only that portion north & west of the Prairie River	VOCs	Contact the DNR Northern Region Office in Rhinelander for <u>required</u> approval
Manitowoc 09/14/88 Area 18/19	Town of Cato (<i>Lemberger Landfill Site</i>) T19E, R22E - Section 1 - NW¼ of the NW¼ - Section 2 - N½ of the N½ - Section 3 - N½ of the N½	VOCs	Contact DNR Northeast Region Office for <u>required</u> approval
Manitowoc 09//14/88 Area 19/18	Town of Franklin (<i>Lemberger Landfill Site</i>) T20N, R22E - Section 22 - SE¼ - S½ of the NE¼ - Section 23 - SW¼ - S½ of the NW¼ - Section 26 (Entire section) - Section 27 - E½ - Section 34 - E½ - Section 35 - W½	VOCs	250' casing <u>required</u>

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Manitowoc 09/14/88 Area 19/18	Town of Franklin(<i>Lemberger Landfill Site</i>) T20N, R22E <ul style="list-style-type: none"> - Section 22 - W$\frac{1}{2}$ - N$\frac{1}{2}$ of the NE$\frac{1}{4}$ - Section 23 - N$\frac{1}{2}$ of the NW$\frac{1}{4}$ - E$\frac{1}{2}$ - Section 24 - W$\frac{1}{2}$ of the W$\frac{1}{2}$ - Section 25 - W$\frac{1}{2}$ of the W$\frac{1}{2}$ - Section 27 - W$\frac{1}{2}$ - Section 34 - W$\frac{1}{2}$ - Section 35 - E$\frac{1}{2}$ - Section 36 - W$\frac{1}{2}$ of the W$\frac{1}{2}$ 	VOCs	Contact DNR Northeast Region Office for <u>required</u> approval
Manitowoc 10/1/93 Area 20	Town of Kossuth (<i>Francis Creek Area: Sinkholes & Farm Drainage Wells</i>) T20N, R23E <ul style="list-style-type: none"> - Section 16 - S$\frac{1}{2}$ of the SW$\frac{1}{4}$ - Section 17 - S$\frac{1}{2}$ of the S$\frac{1}{2}$ - Section 18 - S$\frac{1}{2}$ of the SE$\frac{1}{4}$ - Section 19 - E$\frac{1}{2}$ - Section 20 - Entire section - Section 21 - W$\frac{1}{2}$ - Section 28 - W$\frac{1}{2}$ - Section 29 - Entire section - Section 30 - E$\frac{1}{2}$ - Section 32 - N$\frac{1}{2}$ - Section 33 - NW$\frac{1}{4}$ 	Bacteria	Contact DNR Northeast Region Office for <u>required</u> casing depth.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Milwaukee 12/01/67 Area 21	City of Franklin ("Hale Park Highlands" Subdivision Area LUST Case) T5N, R21E - Section 6 - That portion of the NE¼ of Section 6 bounded on the west and north by Carroll Circle, on the south by an imaginary line extending eastward from the intersection of West Sommerset Drive to intersect North Cape Road and Forest Home Avenue, including all lots abutting the eastern side of Forest Home Avenue in the affected area.	Petroleum products	Greater than 40' into the bedrock <u>required</u>
Milwaukee 01/22/97 Area 22	Village of River Hills (Greenbrook Subdivision – Silurian Reef Deposit) T8N, R22E - Section 6 - SE¼	Naturally-occurring tar and asphaltum found at top of bedrock.	Cement-grouted casing <u>required</u> to the 200-foot depth if this contaminated layer is encountered. Contaminated layer is usually found at the top of bedrock at about the 130-foot depth.
Oconto 10/88 Area 23a	Town of Lakewood (Lakewood DX Gas Station LUST Site) (near intersection of STH 32 & Rugg Rd) T33N, R16E - Section 30 - SE¼ of SW¼ -- That portion south of McCaslin Creek - W½ of SW¼ of SE¼ - SW¼ of NW¼ of SE¼ -- That portion south of McCaslin Creek - Section 31 - NE¼ of NW¼ -- That portion north of Chain Lake Road - W½ of the NW¼ of NE¼	VOCs	Contact DNR Northeast Region Office for <u>required</u> approval. (Water treatment may be necessary.)
Oconto 10/88 Area 23b	Town of Lakewood (Mid-Town Gas Station LUST Site) (near intersection of STH 32 & CTH F) T33N, R16E - Section 32 - NW¼ of the NE¼ - SW¼ of NE¼ -- That part north of STH 32	Gasoline	155 feet of casing or contact DNR Northeast Region Office for <u>required</u> approval.
Outagamie Fall, 1993 Area 24/62	Entire County (except for required areas within Towns of Grand Chute & Center) ("Arsenic Advisory Area")	Arsenic	<u>Recommended</u> 80 feet of grouted casing below the base of Galena-Platteville Dolomite. Contact DNR Northeast Region Office for guidance and map of affected area
Outagamie 06/15/03 Area 74a	Town of Center ("Earthrock Subdivision" Area) T22N, R17E Sections 28, 29 & 30 - S ½ of each of these sections - Sections 31, 32 & 33 (Entire sections)	Naturally occurring inorganic arsenic	Either a shallow Galena-Platteville Dolomite aquifer well; <u>or</u> a well with cement-grouted casing extending to at least the 200-foot depth is <u>required</u> .

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Outagamie 06/15/03 Area 74b	Town of Grand Chute (<i>"Earthrock Subdivision" Area</i>) T21N, R17E - Sections 4, 5 & 6 (Entire sections)	Naturally occurring inorganic arsenic	Either a shallow Galena-Platteville Dolomite aquifer well; <u>or</u> a well with cement-grouted casing extending to at least the 200-foot depth is <u>required</u> .
Outagamie 07/15/03 Area 75	Town of Greenville (<i>"Seasons Field"& "Farms at South Creek" Subds. Areas</i>) T21N, R16E - Sections 16 & 21 (Entire sections)	Naturally occurring inorganic arsenic	Casing <u>required</u> to the 160-foot depth or to the top of firm bedrock, whichever is greater.
Outagamie 03/2/88 Area 25	Village of Bear Creek (<i>Waugamie FS Coop Area</i>) T24N, R15E - Those areas that lie east of the Chicago and Northwestern Railroad right-of-way that are in: - Section 19 - SW¼ of the SE¼ - Section 30 - W½ of the NE¼ - W½ of the E½ of NE¼	Pesticides	Contact DNR Northeast Region Office for <u>required</u> casing depth.
Outagamie 02/11/88 Area 26	Town of Osborn (<i>Dunbar Service Station Gasoline Spill</i>) (<i>City of Seymour</i>) (<i>Intersection of Highways 54 & 55</i>) (Area now served by Seymour municipal water) T23N, R18E - Section 4 - N½ - Section 5 - E½ of E½ of the NE¼	Gasoline	150' casing <u>required</u>
Ozaukee 09/1/00 Area 70	Town of Cedarburg (<i>Kohlwey LUST Site</i>) T10N, R21E - Section 14 - S½ of the SW¼ of the SE¼	VOCs – Petroleum/Gasoline	130' cement-grouted casing <u>required</u>
Ozaukee 01/22/97 Area 27	City & Town of Cedarburg (<i>Prochnow Landfill</i>) T10N, R21E - Section 22 - S½ - Section 23 - S½ - Section 26 (Entire section)	VOCs	Any new water supply well constructed or an existing water supply well reconstruction <u>shall</u> be sampled upon completion and tested for volatile organic compounds (VOCs) using EPA Method 502.2 or 524.2 and the results sent to the DNR Southeast Region Office. <u>Recommended</u> Connection to municipal water system, if possible.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Ozaukee 01/22/97 Area 28	Town & Village of Grafton (<i>Lime Kiln Landfill & Quarry</i>) T10N, R21E - Section 25	VOCs	Any new water supply well constructed or an existing water supply well reconstruction <u>shall</u> be sampled upon completion and tested for volatile organic compounds (VOCs) using EPA Method 502.2 or 524.2 and the results sent to the DNR Southeast Region Office. <u>Recommended</u> Connection to municipal water system, if possible.
Ozaukee 01/16/91 Area 29a	Village of Thiensville (<i>Personal Auto LUST Site</i>) T9N, R21E - Sections 22 and 23 - Those portions of these sections that extend 400 feet north and 400 feet south of Spring Street and eastward from the C. M. St. P. & P. Railroad right-of-way to the Milwaukee River	VOCs	140' casing <u>required</u>
Ozaukee 01/16/91 Area 29b	Village of Thiensville (<i>Spur Gas Station LUST Site</i>) (Roettgers Oil) T9N, R21E Sections 14, 15, 22 and 23 - Those portions of these sections that extend 200 feet north and 200 feet south of Freistadt Road and eastward from the C. M. St. P. & P Railroad right-of-way to a north/south line 200 feet east of the intersection of Freistadt Road and STH 57.	VOCs	160' casing <u>required</u> .
Pierce 10/97 Area 30	Town of Trenton (<i>Hager City Area</i>) T24N, R18W - Section 2 (Portions of this section) (Contact West Central Region Office for better definition of affected area.)	TCE (Trichloroethylene)	Casing <u>shall</u> extend to a depth 5 to 10 feet above sandstone or to the 200-foot depth, whichever is shallower. If depth to sandstone is less than 180 feet, contact DNR's West Central Region Office for <u>required</u> casing depth.
Rock 08/15/03 Area 76	Town of Fulton (<i>Sand & gravel & industrial landfills</i>) (near Edgerton) T4N, R12E - Section 3 - That portion lying south of Hwy 59 and west of N Rock River Rd - Section 10 - That portion lying east of Saunders Creek, south of Hwy 59 and west of N Rock River Rd - Section 11 - That portion lying west of the Rock River, south of West Watts Springs Rd & east of East Watts Springs Rd to its northeasterly extension and, from that point, straight east to the Rock River - Section 14 - That portion lying west and north of the Rock River - Section 15 - That portion lying north of the Rock River and east of Saunders Creek	VOCs, especially trichloroethylene (TCE)	Cement-grouted casing <u>shall</u> extend at least 30 feet into bedrock <u>and</u> to a depth of at least 225 feet.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Rock 03/4/97 Area 31	Town of Turtle (<i>Village of Shopiere Area</i>) T1N, R13E - Section 3 - SE¼	Bacteria	<u>Recommended</u> Cement-grouted casing to extend to at least the 120-foot depth or 15 feet into sandstone, whichever is the greater. Contact DNR South Central Region Office for better definition of the affected area.
Saint Croix 10/90 Revised 7/92, 10/90, 10/2/96 Area 32	Town of Hudson (<i>Junker Landfill, Nor-Lake Area, etc.</i>) T29N, R19W - Sections 13, 14, 15 (Entire sections) - Section 16 - SW¼ - S½, N½, SE¼ - S½, SE¼ - W½, NW¼ - Section 17 - N½ - That portion lying east of the Willow River - N½, S½ - SE¼, SE¼ - Section 18 - N½ of the S½ - That portion lying east of Willow River. - S½ of the N½ - That portion lying east of Willow River. - Section 21 - NE¼ - NW¼ - That portion lying north of the Chicago & Northwestern Railroad - Section 22 - NW¼ - Section 24 - NW¼ - That portion lying north of State Hwy 12 - N½, NE¼ - N½, SE¼, NE¼ - S½, of the SE¼ of the NE¼ - That portion located east of Polen Drive - NE¼ of the SE¼ - That portion lying east of Polen Drive and north of Badlands Rd - SE½ of the NE¼ of the SE¼ - That portion lying south of Badlands Rd	VOCs	<u>Minimum Special Requirements</u> Ten-inch diameter upper enlarged drillhole to a minimum depth of 50 feet into the Cambrian Sandstone. Entire annular space shall be sealed with neat cement grout using a pressure method according to the requirements of s NR 812.20, Wis. Adm. Code. All wells shall be sampled for VOCs within 30 days of completion, and annually until the Department determines sampling is no longer required. <u>Cost of sampling is a responsibility of the well owner unless other parties volunteer or are ordered by DNR to sample.</u>

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Saint Croix 11/11/02 Area 32a	Town of Star Prairie (<i>City of New Richmond Landfills Area</i>) T31N, R18W <ul style="list-style-type: none"> - Sections 21 <ul style="list-style-type: none"> - NE¼ <ul style="list-style-type: none"> - That portion lying east of the Apple River and south of CTH "C" - SE¼ <ul style="list-style-type: none"> - That portion lying east of the Apple River - Section 22 <ul style="list-style-type: none"> - NW¼ of the NW¼ <ul style="list-style-type: none"> - That portion lying west of 110th Street and south of CTH "C" - SW¼ of the NW¼ - SW¼ of the SE¼ - SW¼ - Section 27 <ul style="list-style-type: none"> - NW¼ - W½ of the NE¼ - NW¼ of the SE¼ - N½ of the SW¼ - Section 28 <ul style="list-style-type: none"> - N½ of the NE¼ - SE¼ of the NE¼ - N½ of the SW¼ of the NE¼ 	VOCs	<u>Minimum Special Requirements</u> Ten-inch diameter upper enlarged drillhole to a minimum depth of 50 feet into the Cambrian Sandstone. Entire annular space shall be sealed with neat cement grout using a pressure method according to the requirements of s NR 812.20, Wis. Adm. Code. All wells shall be sampled for VOCs within 30 days of completion, and annually until the Department determines sampling is no longer required. <u>Cost of sampling is a responsibility of the well owner unless other parties volunteer or are ordered by DNR to sample.</u>
Saint Croix June, 2002 Area 32b	Town of Warren (<i>Junker Landfill Area</i>) T29N, R18W <ul style="list-style-type: none"> - Section 19 <ul style="list-style-type: none"> - NW¼ of the NW¼ <ul style="list-style-type: none"> - That portion lying south of STH 12 and south of the Railroad Right of Way - S½ of the NW¼ - N½ of the SW¼ - SE¼ of the SW¼ - W½ of the SE ¼ - S½ of the SW¼ of the NE¼ 	VOCs	<u>Minimum Special Requirements</u> Ten-inch diameter upper enlarged drillhole to a minimum depth of 50 feet into the Cambrian Sandstone. Entire annular space shall be sealed with neat cement grout using a pressure method according to the requirements of s NR 812.20, Wis. Adm. Code. All wells shall be sampled for VOCs within 30 days of completion, and annually until the Department determines sampling is no longer required. <u>Cost of sampling is a responsibility of the well owner unless other parties volunteer or are ordered by DNR to sample.</u>
Sauk 08/16/00 Area 69	Town of Spring Green (<i>Lower Wisconsin River Area</i>) T8N, R3E <ul style="list-style-type: none"> - Sections 2, 3, 4, 5, 8, 9, 10 & 11 (Entire sections) 	Potential difficulty to keep drillhole open	<u>Recommended</u> Percussion drilling method should be used instead of a rotary method.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Sauk 08/14/00 Area 33	Town of Excelsior (<i>Sauk County Landfill Area</i>) T12N, R5E <ul style="list-style-type: none"> - Section 14 <ul style="list-style-type: none"> - SW¼, NW¼ - W½, SW¼ - Section 15 <ul style="list-style-type: none"> - SE¼, NE¼ - E½, SE¼ - SW¼, SE¼ - S½, SW¼ - Section 22 <ul style="list-style-type: none"> - N½, NW¼, NW¼ - N½, NE¼, NW¼ - N½, NW¼, NE¼ - N½, NE¼, NE¼ 	VOCs	Contact DNR South Central Region Office for <u>required</u> casing depth requirements and map of affected area
Sawyer 12/29/95 Area 34a	Town of Hayward (<i>City of Hayward Landfill Area</i>) T41N, R9W <ul style="list-style-type: none"> - Sections 28, 29, 32, and 33 <p>Those portions of Sections 28, 29, 32, and 33 near their common corner. The area of includes: North of the Namekagon River; east of the unnamed Namekagon River tributary; south of a line between the southwest corner of the City of Hayward's abandoned landfill and the intersection of the unnamed tributary and Highway 63; and west of a line running from the southeast corner of the landfill to the intersection of Highway 63 and Stress Road and then running south along the unnamed dirt road and continuing to the Namekagon River.</p>	Landfill Leachate	<u>Recommended</u> 100-foot casing <u>required</u> . (A variance <u>must</u> be obtained to construct any well that will be within 1,200 feet from the landfill.)
Sawyer 09/30/96 Area 34b	Town of Hayward (<i>City of Hayward Landfill Area</i>) T41N, R9W <ul style="list-style-type: none"> - Section 33 - Portions of the S½ of NW¼ 	VOCs	Contact DNR Northern Region Office in Spooner for better definition of affected area and casing <u>required</u> depth.
Shawano 3/84 02/25/88 Area 35	Town of Grant (<i>Village of Caroline</i>) T26N, R13E <ul style="list-style-type: none"> - Section 23 - NE¼ and NW¼ - That portion of land lying within 300 feet of the intersection of County Highway M and East Water Street, and that land parcel that lies between County Highway M and the Embarrass River extending to the southeast all the way to the eastern boundary of the SW¼ of the NE¼. 	Gasoline	65 feet of casing or casing extending to the top of the granite <u>required</u> .

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Sheboygan 12/01/02 Area 73a	<p>Town of Greenbush (South Part) (<i>City of Plymouth Landfill</i>) T15N, R20E</p> <ul style="list-style-type: none"> - Section 36 - NE¼ and SE¼ of the NW¼ - NE¼ of the SW¼ - NW¼ and NE¼ of the SE¼ - N½ of SE¼ of the SE¼ - N½ of SW¼ of the SE¼ - NE¼ <p>Town of Plymouth T15N, R21E</p> <ul style="list-style-type: none"> - Section 31 - NW¼ of the SW¼ - SE¼ of the NW¼ - NW¼ and NE¼ of the SW¼ 	VOCs	<p><u>Required</u></p> <ol style="list-style-type: none"> 1. That any new or replacement well be constructed by drilling through the glacial aquifer into the top 5 feet of bedrock, set permanent well casing, and seal the annular space with neat cement grout, and then drill an open drillhole into the bedrock. 2. That any new or replacement well be tested for volatile organic chemicals and that this information be submitted to the department within 60 days from the date of well construction. Certified laboratory lists can be obtained from the WDNR website or from drinking water supply staff.
Sheboygan 12/01/02 Area 73b	<p>Town of Greenbush (South Part) (<i>City of Plymouth Landfill</i>) T15N, R20E</p> <ul style="list-style-type: none"> - Section 36 - NW¼ and SW¼ of the NW¼ - NW¼, SW¼ and SE¼ of the SW¼ - S½ of the SE¼ - S½ of the SW¼ of the SE¼ <p>Town of Plymouth T15N, R21E</p> <ul style="list-style-type: none"> - Section 31 - NE¼ of the NW¼ - NW¼ and SW¼ of the NE¼ - NE¼ and SE¼ of the NE¼ <ul style="list-style-type: none"> - Those portions located to the west of the ordinary high water mark of Ben Nutt Creek - NW¼ of the SE¼ - NE¼, the SW¼ <ul style="list-style-type: none"> - Those portions located to the west of the ordinary high water mark of Ben Nutt Creek - SE ¼ of the SE¼ <ul style="list-style-type: none"> - Those portions located to the west of the ordinary high water mark of Ben Nutt Creek 	VOCs	<p><u>Recommended</u></p> <ol style="list-style-type: none"> 1. While normal NR 812 construction is <u>required</u>, driller and/or owner contact with WDNR staff before well construction in this area is recommended. 2. That any new or replacement well be tested for VOCs and that this information be submitted to the department within 60 days from the date of well construction. Certified laboratory lists can be obtained from the WDNR website or from drinking water supply staff.

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Sheboygan 01/22/97 Area 36a	Town of Sheboygan (<i>Interstate Plaza Truck Stop LUST Case</i>) T15N, R23E - Section 5 - That portion of Section 5 extending 400 feet north from the intersection of Hwy J and N. 47 th Street, then east 1,200 feet to the edge of Hwy I-43, then south 1,000 feet along the I-43 right-of-way into Section 8, then returning northwesterly 1,300 feet to the starting point at the intersection of Hwy J and N. 47 th Street.	Petroleum	120 feet of casing <u>required</u>
Sheboygan 01/22/97 Area 36b	Town of Sheboygan (<i>Interstate Plaza Truck Stop LUST Case</i>) T15N, R23E - Section 9 - That portion of Section 9 bounded on the north by the section line (Jay Road), on the south by the Pigeon River, on the east by the section line, and on the west by a line running parallel 300 feet west of the Hwy 42 right-of-way.	Petroleum	200 feet of casing <u>required</u>
Sheboygan 01/22/97 Area 37	Town of Sheboygan (<i>Town of Sheboygan Landfill, Spielvogel Landfill, Old Town of Sheboygan Dump</i>) T15N, R23E - Section 16 - W½ - Section 17 - E½ - Section 20 - E½ of the NE¼ - Section 21 - NW¼	VOCs	200 feet grouted casing into bedrock <u>required</u>
Walworth 01/16/91 Area 38	Town of East Troy (<i>Miramar Subdivision</i>) T4N, R18E - Section 10 - E½ (Those portions north of Potter Lake.) - Section 11 - W½, except for the portion south of Potter Lake.	Bacteria and Detergents	<u>Recommended</u> 80 feet casing
Walworth 01/16/91 Area 39a (Segment B)	Town of East Troy (<i>Town of East Troy Landfill</i>) T4N, R18E - Section 15 - NW¼ of the SW¼ - Section 16 - NE¼ of the SE¼	Landfill Leachate	Casing at least to the top of bedrock <u>required</u> .

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Walworth 01/16/91 Area 39b (Segments A, C & D)	Town of East Troy (<i>Town of East Troy Landfill</i>) T4N, R18E <ul style="list-style-type: none"> - Section 15 <ul style="list-style-type: none"> - S½ of the SW¼ - NE¼ of the SW¼ - S½ of the NW¼ - Section 16 <ul style="list-style-type: none"> - SW¼ - S½ of the NW¼ - S½ of the NE¼ - NW¼ of the SE¼ - S½ of the SE¼ - Section 21 <ul style="list-style-type: none"> - N½ of the NE¼ - N½ of the NW¼ 	Landfill Leachate	<u>Recommended</u> Casing to top of bedrock
Washington 01/16/91 Area 40	Town of Barton (<i>Metal Working Site</i>) T12N, R19E <ul style="list-style-type: none"> - Section 27 <ul style="list-style-type: none"> - SE¼ (That portion lying west of the Milwaukee River.) 	VOCs	<u>Recommended</u> Casing to extend 60 feet into bedrock
Washington 01/16/91 Area 41a (Segments C, D & F) (Also see Area 49)	Town of Barton (<i>City of West Bend Landfill</i>) (Schuster Drive Area) T11N, R19E <ul style="list-style-type: none"> - Section 3 <ul style="list-style-type: none"> - S½ of the S½ of the SW¼ (Segment D) - Section 4 <ul style="list-style-type: none"> - S½ of the S½ of the SE¼ (Segment C) - Section 9 (Segment F) <ul style="list-style-type: none"> - E½ (excluding the southern 620 feet) - NE¼ of the SW¼ - E½ of the NW¼ - Section 10 (Segment F) <ul style="list-style-type: none"> - W½ (excluding the southern 620 feet) - W½ of the SE¼ (excluding the southern 620 feet) - SW¼ of the NE¼ 	VOC	Cement-grouted casing <u>required</u> to extend to the base of the Maquoketa Shale

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Washington 01/16/91 Area 41b (Segments A, B, E & G) (Also see Area 49)	Town of Barton (City of West Bend Landfill) (Schuster Drive Area) T11N, R19E <ul style="list-style-type: none"> - Section 3 - S½ (excluding the S½ of the S½ of the SW¼) - Section 4 - S½ (excluding the S½ of the S½ of the SE¼) - Section 9 - W½ of the W½ - SE¼ of the SW¼ - E½ (the southern 620 feet) - Section 10 - E½ of the E½ - NW¼ of the NE¼ - SW¼ of the SE¼ (the southern 620 feet) - SW¼ (the southern 620 feet) 	VOC	<u>Recommended</u> Cement-grouted casing to extend to the base of the Maquoketa Shale
Washington 01/16/91 Area 42a	Town of Germantown (Rockfield LUST Site) (very high bedrock area) T9N, R20E <ul style="list-style-type: none"> - Sections 9 and 10 Those portions that are 500 feet to the east, 500 feet to the west, 200 feet to the north, and 300 feet to the south of the intersection of Rockfield Road and CTH G (Division Road)	Gasoline	100' of cement-grouted casing <u>required</u>
Washington 01/16/91 Area 42b	Town of Germantown (Rockfield LUST Site) (very high bedrock area) T9N, R20E <ul style="list-style-type: none"> - Section 9 - NE¼ of the SE¼ - Section 10 - NW¼ of the SW¼ 	Bacteria, Gasoline, Nitrate	<u>Recommended</u> 80' of casing
Washington 01/22/97 Area 43	Town of Germantown (Willow Creek Area) T9N, R20E <ul style="list-style-type: none"> - Section 29 - SW¼ of the SW¼ - Section 32 - NW¼ of the NW¼ 	Gasoline	<u>Recommended</u> 150' cement grouted casing pipe
Washington 01/22/97 04/09/98 Area 44/55 (Segment B)	Town of Germantown (Happy Hollow Subdivision Area) T9N, R20E <ul style="list-style-type: none"> - Section 31 - S½ of the SW¼ 	Gasoline	<u>Recommended</u> 220' of casing

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Washington 01/22/9 04/09/98 Area 44/55 (Segment A)	Town of Richfield (<i>Amy Bell Road Site</i>) T9N, R19E - Section 36 - SE¼ of the SE¼ (Also see requirements in Waukesha County, Village of Menomonee Falls, Section 6 and Town of Lisbon, Section 1)	Gasoline	<u>Recommended</u> 220' of casing
Washington 01/22/97 Area 45	Town of Richfield (<i>Goetz Garage LUST Site</i>) T9N, R19E - Section 12 and 13 - That portion of Section 12 which lies one-eighth mile north of County Hwy 167 and that portion of Section 13 which lies one-eighth mile south of County Hwy 167 and bounded on the west by County Hwy 175 and on the east by the C.M. St. P. & P. Railroad right-of-way. (Five wells replaced by PECFA)	Gasoline	100' of casing into bedrock <u>required</u>
Washington 01/22/91 Area 46a (Segments F & G)	Town of Jackson (<i>Division Road high bedrock area</i>) T10N, R20E - Section 27 - NW¼ - W½ of the NE¼ - Section 28 - E½ of the NE¼	Bacteria, Nitrate	Minimum of 220' cement grouted casing <u>required</u> (<u>Recommend</u> all wells be sampled for nitrate.)
Washington 01/22/91 Area 46b (Segments B, C, D & E)	Town of Jackson (<i>Division Road high bedrock area</i>) T10N, R20E - Section 21 - SE¼ - Section 22 - SW¼ - Section 27 - E½ of the NE¼ - SW¼ - Section 28 - W½ of the NE¼ - SE¼	Bacteria, Nitrate	Minimum of 120' cement grouted casing <u>required</u> (<u>Recommend</u> all wells be sampled for nitrate.)
Washington 01/16/91 Area 46c (Segments A-G)	Town of Jackson (<i>Division Road high bedrock area</i>) T10N, R20E - Sections 21, 22, 27 and 28 (Entire sections)	Bacteria, Nitrate	<u>Recommended</u> That all new and existing wells be sampled for nitrate.
Washington 01/16/91 Area 47	Town of Polk (Ackerville) (<i>Town Dump & Landfill Site</i>) T10N, R19E - Section 20 SE¼	VOCs	210 feet of casing <u>required</u>

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Washington 01/16/91 Area 48	Town of Wayne (<i>Kohlsville LUST Site</i>) T12N, R18E <ul style="list-style-type: none"> - Section 26 <ul style="list-style-type: none"> - SW¼ of the SW¼ of the SW¼ - That portion lying south of the Kohlsville River - Section 27 <ul style="list-style-type: none"> - SE¼ of the SE¼ of the SE¼ - That portion lying south of the Kohlsville Mill Pond and 200 feet west of CTH W - Section 34 <ul style="list-style-type: none"> - NE¼ of the NE¼ of the NE¼ (The east 200 feet) - Section 35 <ul style="list-style-type: none"> - NW¼ of the NW¼ of the NW¼ 	Gasoline	150 feet of casing <u>required</u>
Washington 01/22/97 Area 49 (Also see Area 41)	Town of West Bend (<i>City of West Bend Landfill Area</i>) T11N, R19E <ul style="list-style-type: none"> - Sections 15 and 16 (Entire sections) (Also, see requirements for Area 41: Washington County, Town of Barton, Sections 3, 4, 9 & 10)	VOCs	<u>Recommended</u> Cement-grouted casing to extend to the base of the Maquoketa Shale
Washington 01/22/97 Area 50	Town of West Bend (<i>Silver Lake Highland Subdivision</i>) T11N, R19E <ul style="list-style-type: none"> - Section 27 <ul style="list-style-type: none"> - SE¼ of the SE¼ - That portion within 1,000 feet of 18th Avenue (along Quass Drive). 	Methane gas	<u>Recommended</u> Construction of a bedrock well to avoid naturally occurring methane gas in gravel aquifer at 108 feet.
Waukesha 11/08/63 Area 57	City of Brookfield (<i>Hill 'n Dale Subdivision</i>) (High & creviced bedrock) T7N, R20E (Also see Town of Pewaukee) <ul style="list-style-type: none"> - Section 7 <ul style="list-style-type: none"> - W½ of the SW¼ - SW¼ of the NW¼ - Section 18 <ul style="list-style-type: none"> - NW¼ of the NW¼ 	Bacteria	135 feet of cement-grouted casing <u>required</u> .

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Waukesha 12/01/77 Area 51	Town of Delafield (<i>Nickel Landfill Site</i>) T7N, R18E <ul style="list-style-type: none"> - Section 21 <ul style="list-style-type: none"> - S½ of the NE¼ - NW¼ - NE¼ of the SW¼ - N½ of the SE¼ of the SW¼ - N½ of the NW¼ of the SW¼ - SE¼ - Section 22 <ul style="list-style-type: none"> - SW¼ of the NE¼ - S½ of the NW¼ - W½ of the SE¼ - SW¼ - Section 27 <ul style="list-style-type: none"> - N½ of the NW¼ - N½ of the SW¼ of the NW¼ - N½ of the S½ of the SW¼ of the NW¼ - NW¼ of the NE¼ - Section 28 <ul style="list-style-type: none"> - NE¼ of the NE¼ - N½ of the SE¼ of the NE¼ - N½ of the S½ of the SE¼ of the NE¼ 	VOCs, Landfill Leachate	Cement-grouted casing to extend to the base of the Maquoketa Shale <u>required</u>
Waukesha 09/08/70 Area 52a	Town of Genesee (<i>Saylesville Pond Area – high limestone bedrock area</i>) T6N, R18E <ul style="list-style-type: none"> - Section 23 <ul style="list-style-type: none"> - SE¼ - Section 24 <ul style="list-style-type: none"> - SW¼ - Section 25 <ul style="list-style-type: none"> - W½ - Section 26 <ul style="list-style-type: none"> - E½ 	Bacteria	200 feet of cement-grouted casing <u>required</u>

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Waukesha 09/08/70 Area 52b	Town of Genesee (<i>Saylesville Pond Area – high limestone bedrock area</i>) T6N, R18E [Within ½-mile of Area 52a (above)] Section 23 - NE¼ - W½ - Section 24 - NW¼ - E½ - Section 25 - E½ - Section 26 - W½ - Section 35 - N½ - Section 36 - N½	Bacteria	200 feet of cement-grouted casing or special approval <u>required</u>
Waukesha 12/31/58 Area 59b	Village of Lannon (<i>Incorporated Village Area</i>) (high bedrock area) T8N, R20E - Section 8 - Most of the S½ except for the W½ of the SW¼ thereof. - Section 17 except for the W½ of the NW¼ thereof. - Section 18 - S½ - Section 19 - That portion of the W½ lying west and north of STH 74. - That portion of the NE¼ lying NW of STH 74 and north of the Village limit (lying south of Forest View Ave). - Section 20 - The N½ except for a small parcel in the SW corner thereof.	Bacteria	100 feet of cement-grouted casing or special approval <u>required</u>
Waukesha 12/31/58 Area 53a	Town of Lisbon (<i>High bedrock & quarries area</i>) T8N, R19E (Including the Village of Sussex) - Within ½ mile of quarry or rock outcrops	Bacteria	100 feet or special approval <u>required</u>
Waukesha 01/16/91 Area 53b	Town of Lisbon (<i>High bedrock & quarries area</i>) T8N, R19E - Slightly greater than ½ mile of quarries or rock outcrops	Bacteria	<u>Recommended</u> 100 feet of casing

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Waukesha 01/22/97 Area 55/44 (Segment D)	Town of Lisbon (<i>Rapid Mart LUST Site</i>) (<i>Happy Hollow Subd Area</i>) T8N, R19E - Section 1 - That portion that is bounded by lines 200 feet south of the centerline of Hwy Q and 300 feet west of the centerline of Hwy V (Also, see requirements in Village of Menomonee Falls and in Washington Co., Town of Germantown and Town of Richfield.)	Gasoline	220 feet of casing <u>required</u>
Waukesha 01/22/97 Area 54/58 (Segment A)	Town of Lisbon (<i>Village of Sussex</i>) T8N, R19E - Sections 22, 25, 26, 27, 34, 35 and 36 (Entire sections)	Bacteria	150 feet of casing or special approval <u>required</u>
Waukesha 01/22/97 Area 55/44 (Segment C)	Village of Menomonee Falls (<i>Rapid Mart LUST Site</i>) T8N, R20E - Section 6 - That portion bounded by lines 200 feet south of the center line of Hwy Q and 300 feet east of the center line of Hwy V. (Also, see requirements: Washington County, Town of Germantown, Section 31 and Town of Richfield, Section 36 and Waukesha County, Town of Lisbon, Section 1)	Gasoline	220 feet of casing <u>required</u>
Waukesha 12/31/58 Area 59a	Village of Menomonee Falls (<i>High Bedrock Area</i>) T8N, R20E - Section 1 through 36, (Also see Village of Lannon)	Bacteria	100 feet of casing or special approval <u>required</u>
Waukesha 01/16/91 Area 56b	Town of Merton (<i>Stonebank LUST Site</i>) T8N, R18E - Section 19 - E½ of the SE¼ of the NW¼ - That portion of the SW¼ of the NE¼ of located west of Oconomowoc River	VOCs	Casing to the top of bedrock <u>required</u>
Waukesha 01/16/91 Area 56a & c	Town of Merton (<i>Stonebank LUST Site</i>) T8N, R18E - Section 19 - W½ of the SE¼ of the NW¼ - That portion of the NW¼ of the SE¼ of located west of the Oconomowoc River	VOCs	<u>Recommended</u> Casing to the top of bedrock

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Waukesha 01/2004 Area 67a	City of Muskego – East Part (<i>Muskego Landfill</i>) T5N, R20E <ul style="list-style-type: none"> - Section 17 <ul style="list-style-type: none"> - SW¼ and NW¼ of the NW¼ - SW¼ and NW¼ of the SW¼ - Section 18 <ul style="list-style-type: none"> - SW¼ and SE¼ of the NE¼ - SE¼ and SW¼ of the SW¼ - The entire SE¼ - Section 19 <ul style="list-style-type: none"> - NE¼ of the NE¼ - NW¼ of the NE¼ - N½ of the SE¼ of the NE¼ - N½ of the SW¼ of the NE¼ - NE¼ of the NW ¼ 	VOCs	<u>Recommended:</u> Connection to municipal water system. <u>Required:</u> 1. Contact the WDNR Southeast Region Office for updated construction requirements. 2. Any new water supply well constructed or an existing water supply well reconstruction shall be sampled upon completion and tested for volatile organic compounds (VOCs) using EPA Method 502.2 or 524.2 and the results sent to the DNR Southeast Region Office.
Waukesha 01/2004 Area 67b	City of Muskego – East Part Part (Muskego Landfill) T5N, R20E <ul style="list-style-type: none"> - Section 17 <ul style="list-style-type: none"> - NE¼, SW¼ and SE¼ of the SW¼ - NE¼, NW¼ and SE¼ of the NW¼ - Section 18 <ul style="list-style-type: none"> - NE¼ and NW¼ of the NE¼ - Section 19 <ul style="list-style-type: none"> - S½ of the SE¼ of the NE¼ - S½ of the SW¼ of the NE¼ - SE¼, NW¼ and SW¼ of the NW¼ - NE¼ of the SW¼ - NW¼ and NE¼ of the SE¼ - Section 20 <ul style="list-style-type: none"> - NW¼ and SW¼ of the SW¼ - NW¼ of the SW¼ 	VOCs	<u>Recommended:</u> 1. Any new water supply well constructed or an existing water supply well reconstruction shall be sampled upon completion and tested for volatile organic compounds (VOCs) using EPA Method 502.2 or 524.2 and the results sent to the DNR Southeast Region Office. 2. Contact the WDNR Southeast Region Office for updated construction recommendations.
Waukesha 11/08/63 Area 57	Town of Pewaukee (<i>Hill 'n Dale Subdivision – High & Creviced Bedrock Area</i>) T7N, R19E (Also see City of Brookfield) <ul style="list-style-type: none"> - Section 12 <ul style="list-style-type: none"> - SE¼ - S½ of the NE¼ - Section 13 <ul style="list-style-type: none"> - N½ of the NE¼ <p>(Also see Waukesha County, City of Brookfield for other segment of this area.)</p>	Bacteria	135 feet cement-casing <u>required</u>

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Waukesha 01/22/97 Area 58 (Segment B)	Town of Pewaukee (<i>High & Creviced Bedrock Area</i>) T7N, R19E - Section 1 N½ - Section 2 - N½	Bacteria	100 feet casing <u>required</u>
Waupaca 03/2/88 Area 60	Town of Waupaca (<i>Waupaca Foundry</i>) T22N, R12E - Section 28 - SW¼ - NW¼, that portion south of the Soo Line Railroad Tracks	VOCs	Contact DNR Northeast Region Office for <u>required</u> casing depth
Waushara 02/24/88 Revised 03/9/94 Area 61	City of Wautoma (<i>Nine Separate Spills</i>)	VOCs, Gasoline, Pesticides	Contact DNR Northeast Region Office for <u>required</u> casing depth
Winnebago Dec., 1993 Area 62/24	Entire County (" <i>Arsenic Advisory Area</i> ") (except for required area in the Towns of Algoma & Omro)	Arsenic – naturally occurring inorganic	<u>Recommended</u> 80 feet of grouted casing below the base of Galena-Platteville Dolomite. Contact DNR Northeast Region Office for guidance and map of affected area
Winnebago 04/22/02 08/03/02 Area 72	Town of Algoma (<i>Town of Algoma/Omro Arsenic Area</i>) T18N, R16E - Sections 7, 8, 9, & 16 - Those portions lying south of Lake Butte Des Morts - Sections 17, 18, 19, 20, 21, 28, 29, 30 - Entire sections	Arsenic – naturally occurring inorganic	<u>Required</u> Grouted casing to extend at least to the top of the Cambrian Sandstone (Contact DNR for map of area and construction conditions.)
Winnebago 06/21/2004 Area 77a	Town of Clayton (<i>Town of Clayton/Neenah Arsenic Area</i>) T20N, R16E - Sections 25 and 36	Arsenic – naturally occurring inorganic	<u>Required</u> Grouted casing to extend at least to the top of the Cambrian Sandstone (Contact DNR for map area and construction conditions.)

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Winnebago 04/22/02 08/03/02 Area 72	Town of Omro (<i>Town of Algoma/Omro Arsenic Area</i>) T18N, R15E <ul style="list-style-type: none"> - Sections 1 - That portion lying south of Lake Butte Des Morts - Section 2 - SE ¼, that portion lying south of Lake Butte Des Morts - Section 11 - E½, that portion lying south of Lake Butte Des Morts - Section 12 - That portion lying south of Lake Butte Des Morts - Sections 13, 24 & 25 - Entire sections - Sections 14, 23 & 26 - E½ 	Arsenic – naturally occurring inorganic	<u>Required</u> Grouted casing to extend at least to the top of the Cambrian Sandstone (Contact DNR for map area and construction conditions.)
Winnebago 01/26/61 Area 63a	Town of Menasha (<i>High Bedrock Area</i>)(Intersection of Hwy 150, Old Hwy 41 & Hwy II) T20N, R17E <ul style="list-style-type: none"> - Sections 16, 17, 20 and 21 - Those portions located within ¼-mile of the intersection of Highways 150, Old 41 & Hwy II. (The intersection is near the junction of Sections 16, 17, 20 & 21.) 	Bacteria	80 feet of grouted casing <u>required</u>
Winnebago 01/26/61 Area 63b	Town of Menasha (<i>High Bedrock Area</i>)(Intersection of Hwy 150, Old Hwy 41 & Hwy II) T20N, R17E <ul style="list-style-type: none"> - Sections 16, 17, 20 and 21 - Those portions located between ½ and ¼-mile of the intersection of Highways 150, Old 41 & Hwy II. (The intersection is near the junction of Sections 16, 17, 20 & 21.) 	Bacteria	60 feet of grouted casing <u>required</u>
Winnebago 06/21/2004 Area 77b	Town of Neenah (<i>Town of Clayton/Neenah Arsenic Area</i>) T20N, R17E <ul style="list-style-type: none"> - Sections 30 and 31 	Arsenic – naturally occurring inorganic	<u>Required</u> Grouted casing to extend at least to the top of the Cambrian Sandstone (Contact DNR for map area and construction conditions.)
Winnebago 3/88 Revised 10/96 Area 64	Town of Winchester (<i>LUST Site – Hwy 150</i>) T20N, R15E <ul style="list-style-type: none"> - Section 13 - SW¼ - Section 14 - SE¼ - Section 23 - N½ of the NE¼ - Section 24 - N½ of the NW¼ - N½ of the S½ of the NW¼ 	Gasoline	100 feet of casing <u>required</u>

COUNTY	LOCATION	CONTAMINANT	CASING REQUIREMENTS
Wood 11/18/96 Area 68	Town of Sherry (<i>Village of Sherry</i>)(Buried Petroleum Tank Site) T24N, R5E - That portion of the NE¼ of the NW¼ and the SE¼ of the SW¼ of Section 4 that are north and west of CTH F; east of 2nd Street and south of a line 150 feet north of CTH N (Main Street)	VOCs	100 feet of casing <u>required</u> ; hydrofracturing allowed <u>only</u> with Department approval.

Last Revised 7/15/04 w:\prog_sup\roger\wellcase.doc 9/28/2004